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Three Small Chapels

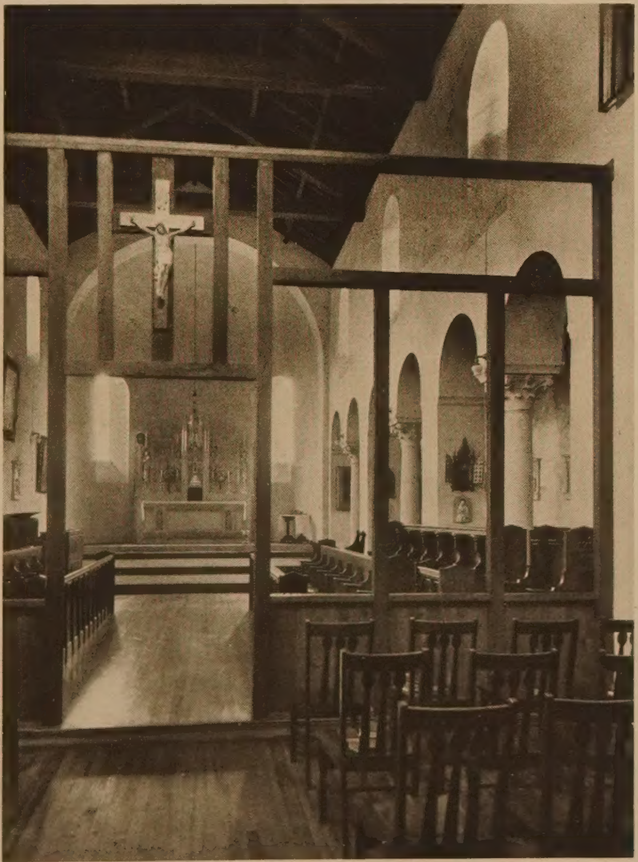
Cram & Ferguson, Architects

By Ralph Adams Cram

THE chapel for the Order of the Holy Cross at West Park, New York, is an attempt to develop a type of architecture that may be significant of its function and at the same time meet a number of varied and even opposed considerations.

In the first place, it was necessary that this chapel should be as inexpensive as was consistent with acceptable architecture and good construction. Then it was, of course, imperative that it should be a conscientious working out of purely Christian forms in art, suggestive of monastic usage and tradition, and not too aloof from an older adjoining building (the monastery) which was none too consonant with the principles outlined above.

In a way, it was the third stage in a process of development that began with a private chapel at Whitehall, Sudbury, Mass., and was continued in somewhat larger form in the chapel for the Sisters of St. Anne, at St. John's House, Arlington Heights, Mass. In each case local materials were used, and reliance was placed on form and proportion to the almost total exclusion of ornament. At the Monastery of the Holy Cross it was possible to use a rough local stone which had little promise, on the surface, of practicality, together with brick produced in the immediate neighborhood. The stone and the brick have been blended into each other in a more or less casual and yet rather carefully studied manner, after the fashion that is to be found in the Italian and Spanish building of the earlier Middle Ages.



Interior, chapel for the Order of the Holy Cross.

The style, if there is a style, is that which is found in the same places and dating from the same period, that is, the instinctive work of untrained men who, under the impulse of a new religious energy, went to work to build straightforwardly in accordance with their inherited memory of what architecture once was and, as far as they were able to do so, after the fashion of the ruinous old structures of the later Roman Empire. About all they knew was that churches were built of masonry, that they had a semicircular easterly termination, that the windows and doors had round arches while the roofs were of the simplest type of timber construction covered with tiles. There was, of course, a plentiful supply of marble columns from the dilapidated Roman buildings, together with some capitals and miscellaneous pieces of carved ornament. Working along these lines, the builders of the tenth and eleventh centuries produced simple and straightforward

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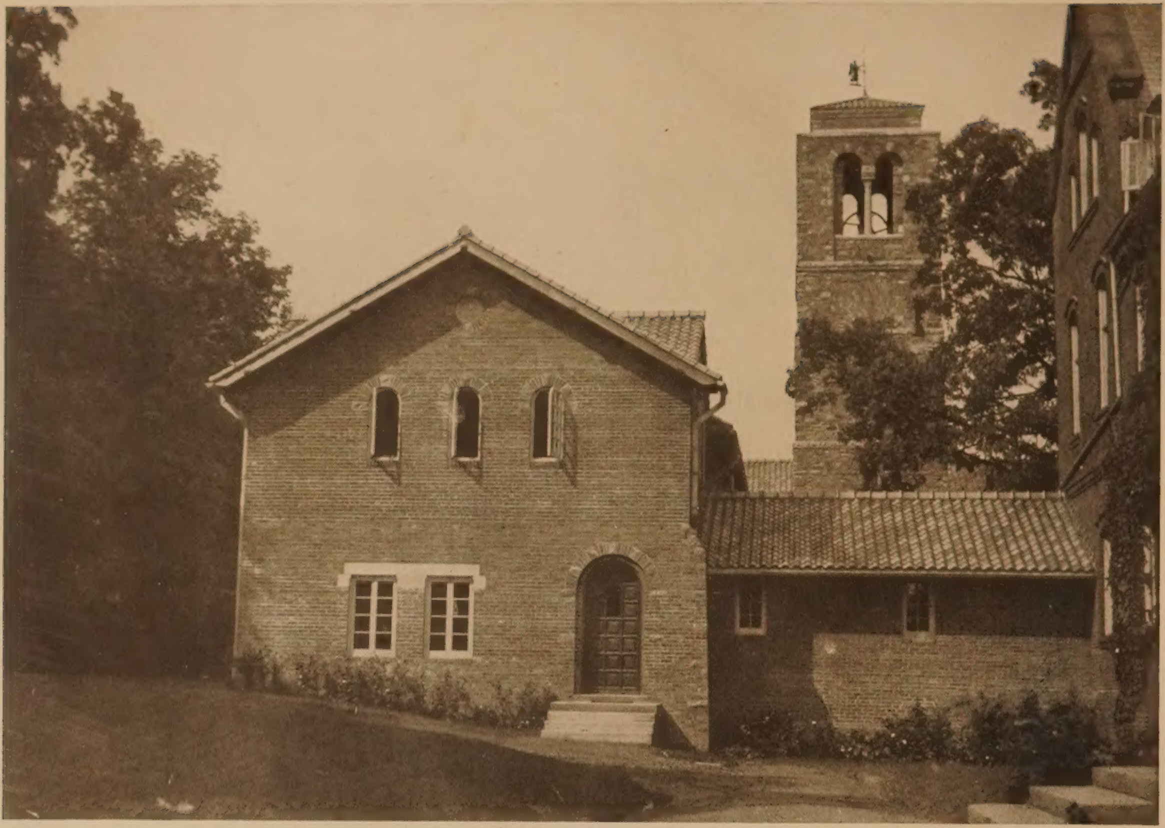
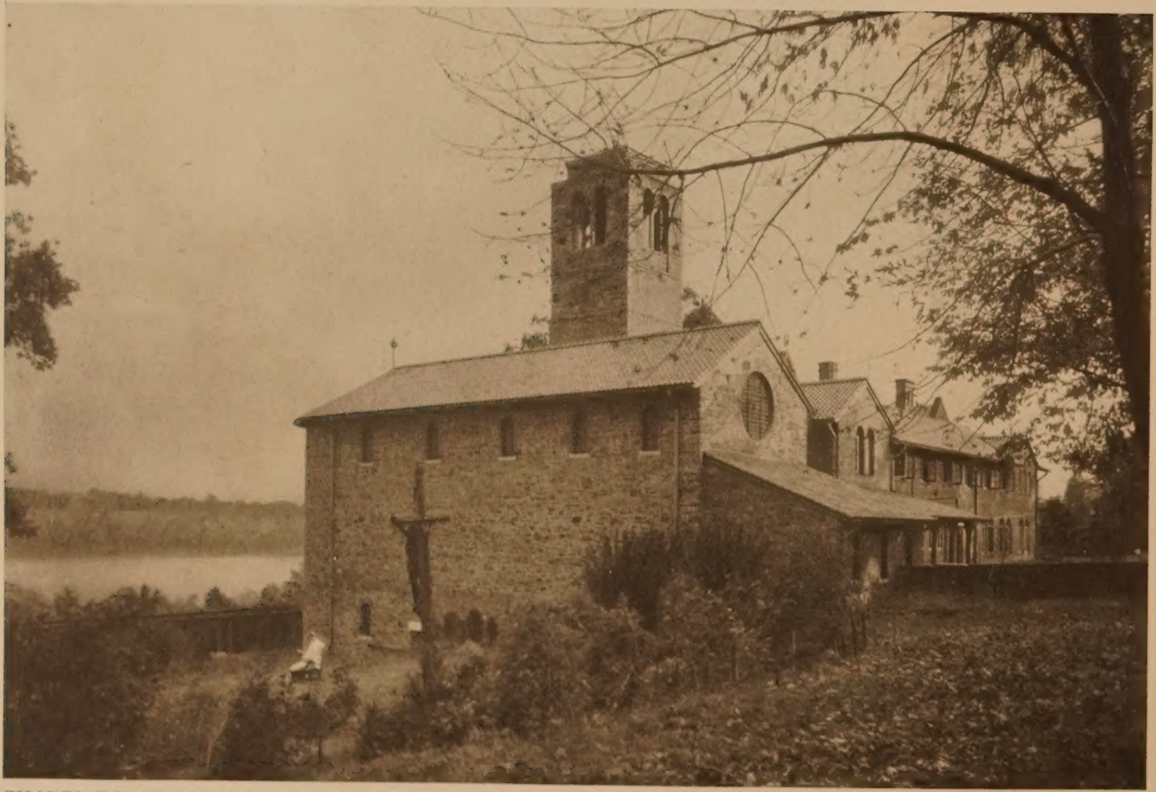
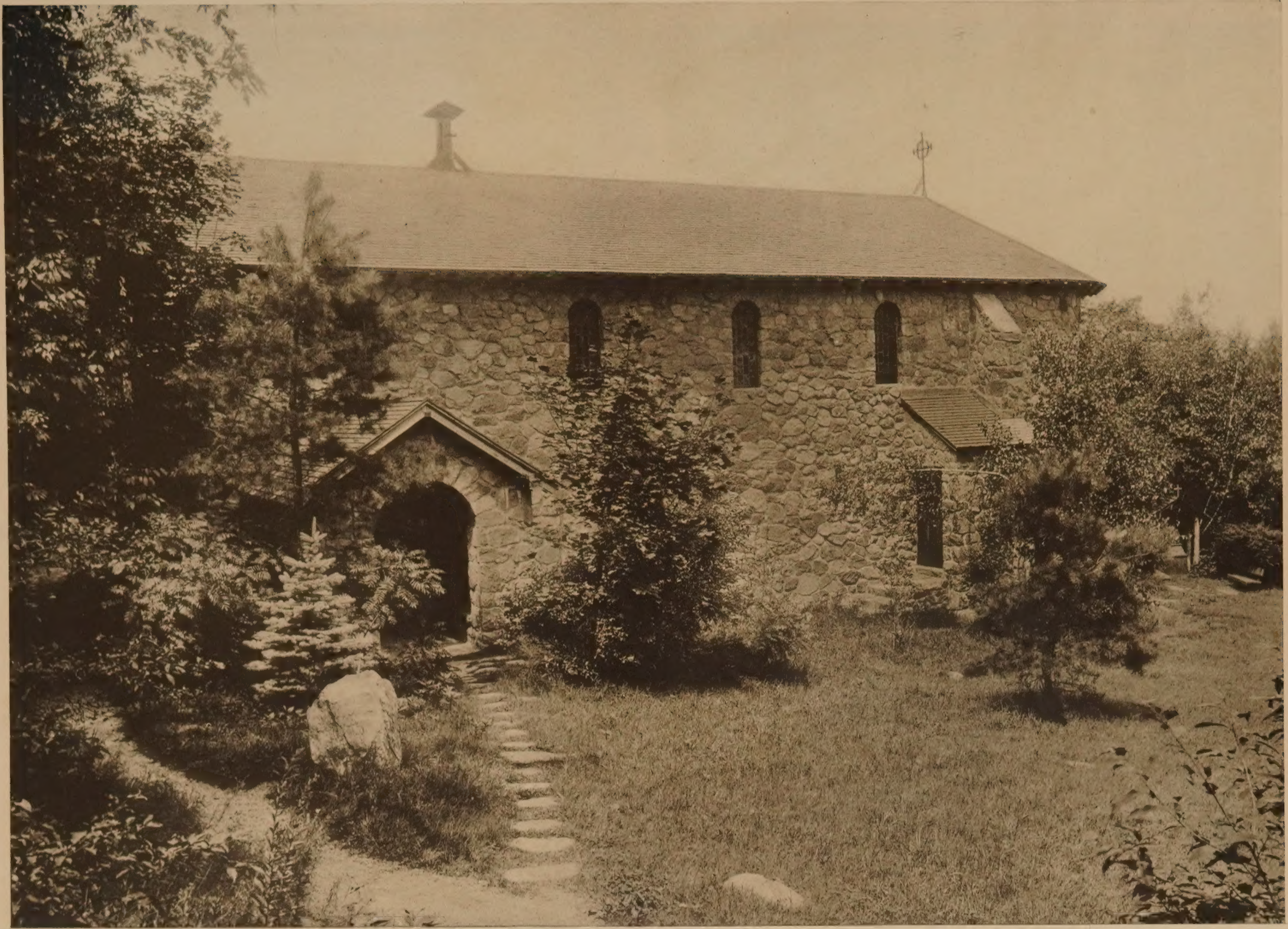


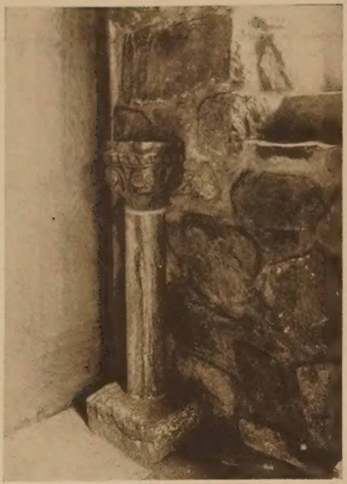


CHAPEL FOR THE ORDER OF THE HOLY CROSS, WEST PARK, N. Y. Cram & Ferguson, Architects.



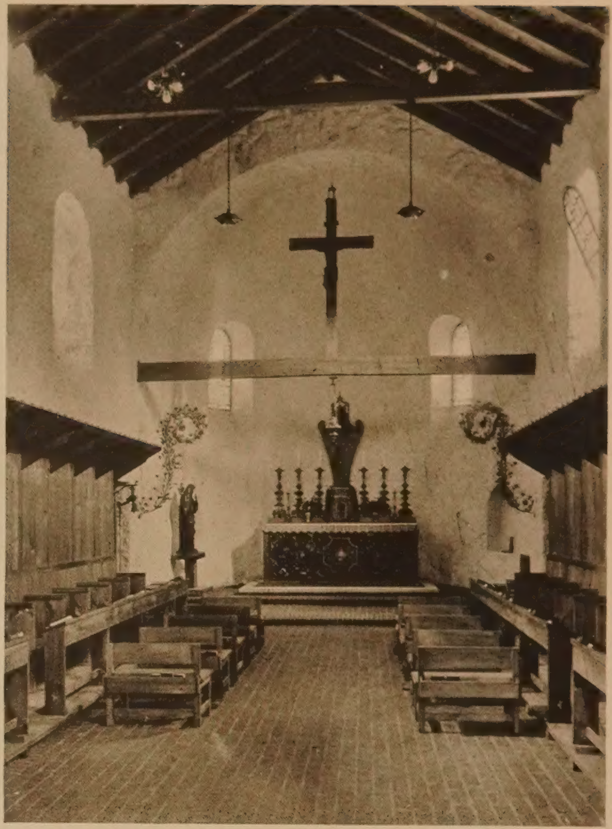
CHAPEL FOR THE SISTERS OF ST. ANNE, ARLINGTON HEIGHTS, MASS.

Cram & Ferguson, Architects.

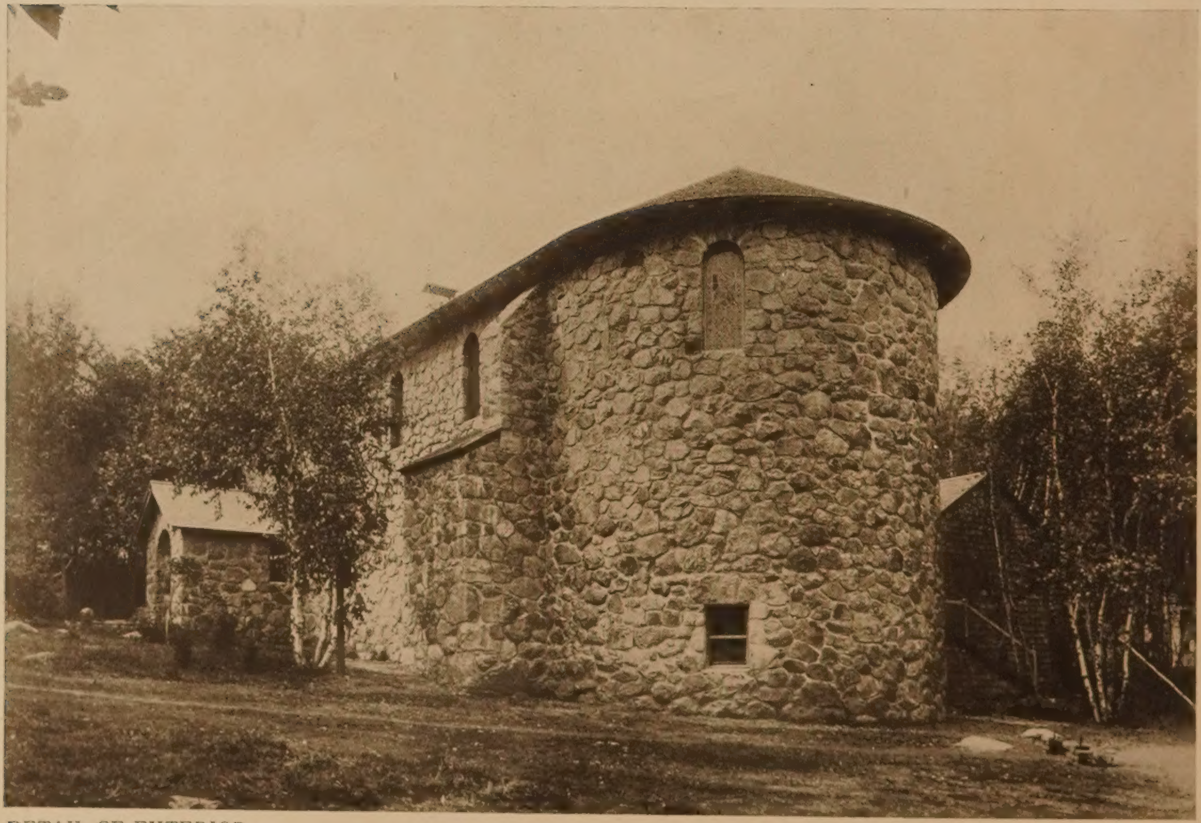


DETAIL IN STONEWORK OF PORCH.

The interior walls of the Arlington chapel are of rough stone, whitewashed.

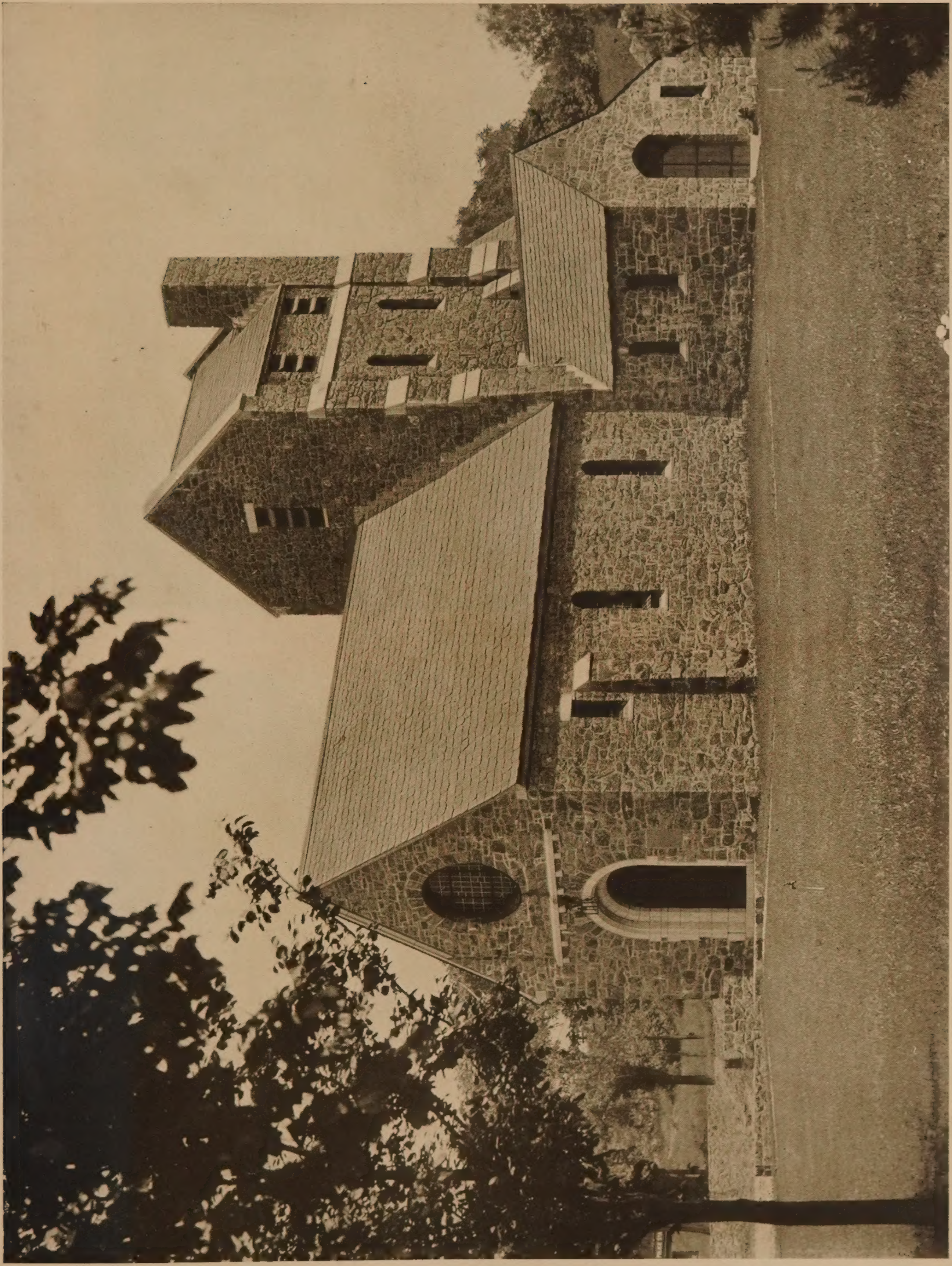


INTERIOR.



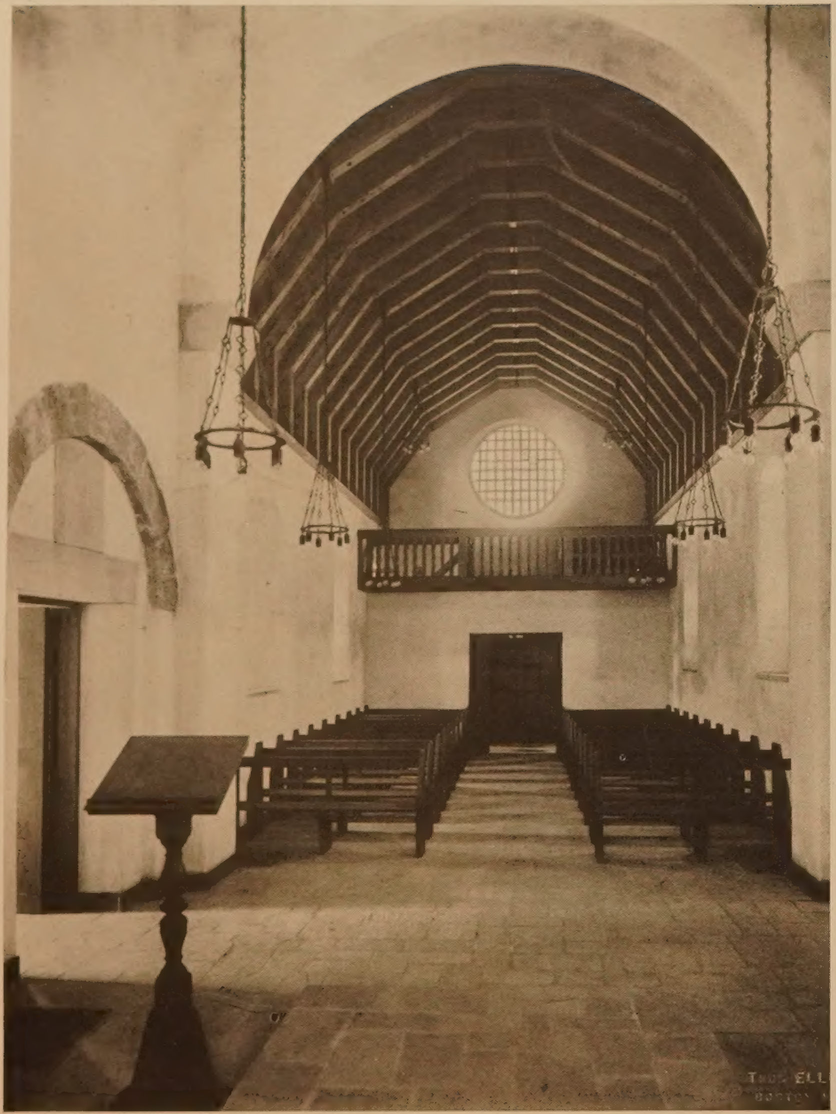
DETAIL OF EXTERIOR.

CHAPEL FOR THE SISTERS OF ST. ANNE, ARLINGTON HEIGHTS, MASS.

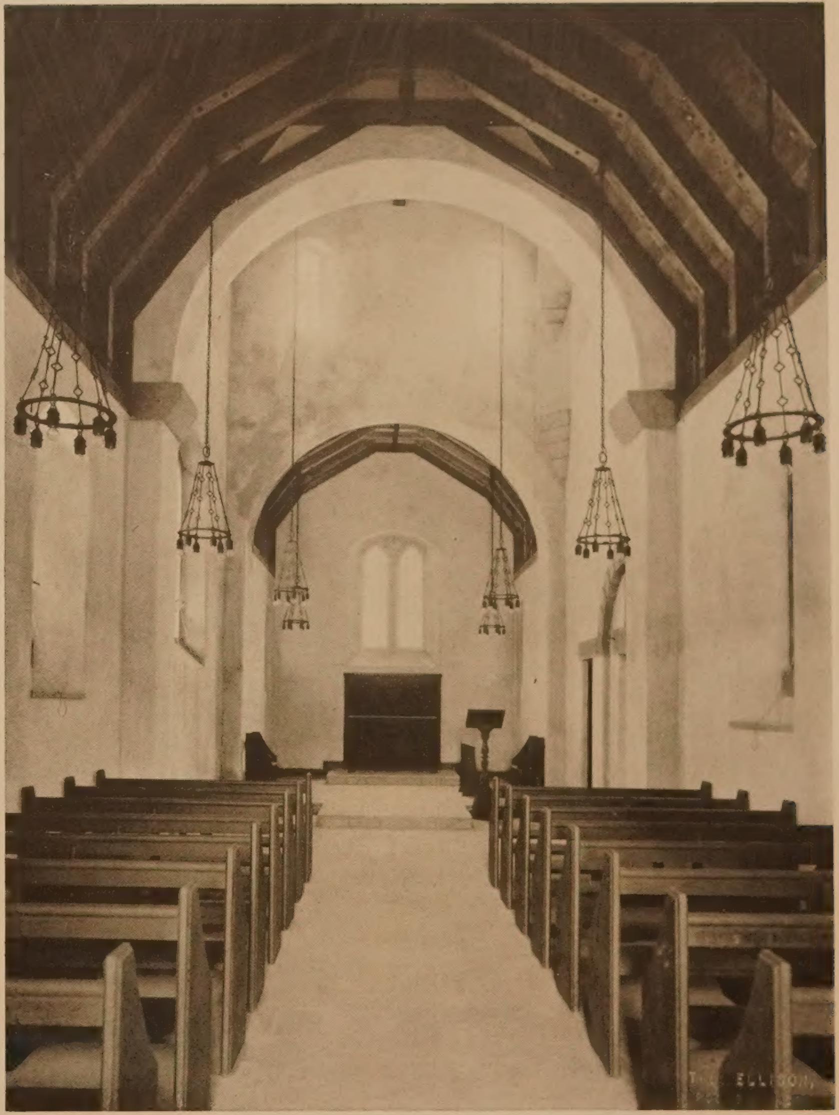


CEMETERY CHAPEL, NAHANT, MASS.

Cram & Ferguson, Architects.



INTERIOR.



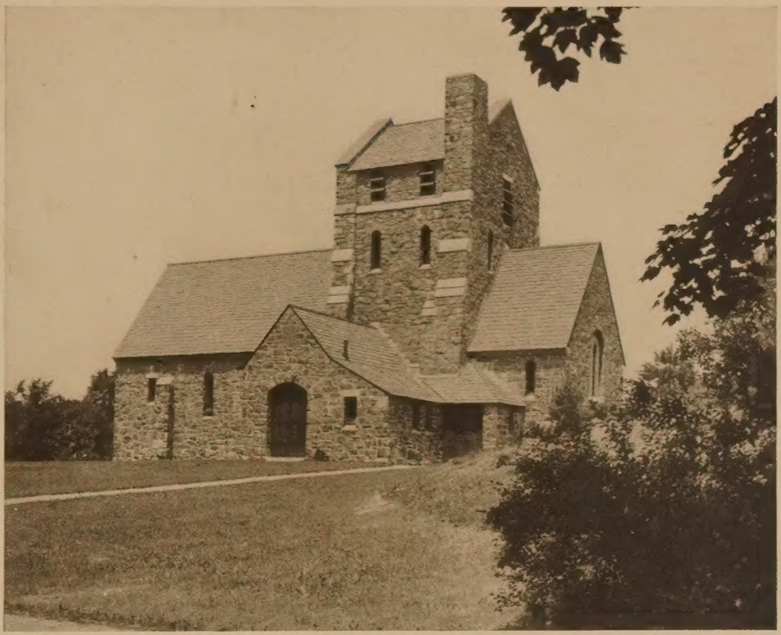
INTERIOR.

CEMETERY CHAPEL, NAHANT, MASS.

The floor slabs are of rough slate.

(*Continued from page* 363)

structures possessed of a certain charm and a great deal of sincerity. Work of this kind is not localized. It is more or less the same whether it is found in Italy, Spain, southern France, the Rhineland, Scandinavia, or Wales. It is the beginning of the great architectural development that started under the Lombards in Italy and worked its way north and west along the trade routes and pilgrimage roads into France, Spain, Germany, and Great Britain, culminating at last, by way of Romanesque and Norman, in the fully developed Gothic of the thirteenth century.



Cemetery chapel, Nahant, Mass. Cram & Ferguson, Architects.

The chapel itself is the simplest type of basilica, with apse and semi-dome, and along one side an aisle or "processional path" separated from the chapel proper by an arcade of marble columns and round arches. Longitudinally it is divided after the monastic fashion into a sanctuary, monks' choir, ante-chapel, and women's chapel. At the end of the processional path is the shrine of Our Lady, with the necessary sacristies, etc. The crypt will in time contain other sacristies and a number of subsidiary chapels, so that several masses may—as is necessary in a monastery—be said at the same time. Near the sanctuary rises the campanile, which follows rather closely the Lombard type.

At present the fittings of the chapel are more or less temporary. The Gothic High Altar, constructed some years ago, has been taken from the temporary chapel, while the monks' stalls and the screen will serve until permanent work is installed. Ultimately it is hoped that funds may be forthcoming for filling the windows with stained glass and covering much of the walls with paintings.

A Museum of American Colonial Art

Mr. and Mrs. De Forest's Magnificent Gift of a New Wing to the Metropolitan Museum of Art

PRESIDENT ROBERT W. DE FOREST and Mrs. De Forest have given the money for the addition of a new wing for the Metropolitan Museum of Art to be devoted entirely to American art of the Colonial, Revolutionary, and early republican periods. The building, it is stated, will cost at least $200,000.

An interesting feature of the gift will be part of the south façade of the wing, where will be reconstructed the marble façade of the United States Branch Bank, familiarly known as the old United States Assay Office, which was formerly at 15 Wall Street, where the new Assay Office now stands.

This beautiful façade was preserved through the efforts of Mr. De Forest with a view to this use. The façade is dominated by a central bay, in which an applied Ionic colonnade, resting upon a rusticated basement, supports an entablature and pediment. This central bay is flanked with simpler bays carrying out the divisions of basement story, main story, and entablature. The material is Westchester marble.

In its final form the new American wing will form the north side of a quadrangle, on the south of which will be reconstructed the Wentworth-Gardner house from Portsmouth, N. H., purchased some years ago. The east and west sides of the enclosure will be formed by one-story connecting corridors, against the walls of which will be set Colonial doorways. The ground within will be treated as a Colonial garden. Plans for the structure have been prepared by Grosvenor Atterbury in collaboration with the museum authorities, who have had them under consideration since the museum's special demonstrations of Colonial art during the Hudson-Fulton celebration convinced the authorities of the immediate need of appropriate additional exhibition space.

The Historic Use of Color in Architecture

By Rexford Newcomb

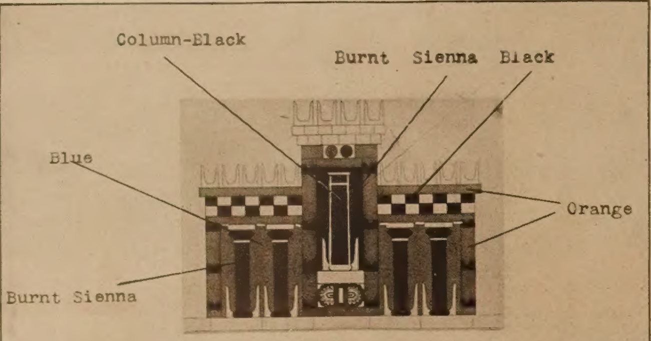
Professor of Architectural History, University of Illinois

From an illustrated address before the Central Illinois Chapter of the American Institute of Architects

PART II

OUR knowledge of Greek polychromy dates from the middle of the last century, and it is only within recent years that archæologists generally admit the use of color upon the exteriors of the beautiful white marble buildings of the Greeks. With a preponderance of unmistakable evidence in this direction, however, there is no longer any serious student who disputes its use. The discoveries of Hittorff in the Doric colonies of Sicily in 1823–1824 brought forth a considerable interest in external coloration in architecture, especially in England and France, and many of the papers presented at the meetings of the Royal Institute of British Architects from 1840 on have to do with this very question.

The use of color in Greece is explained by the more brilliant light of that country, a light that, reflected, destroyed the relief and made necessary, especially upon the more diminutive portions of the entablature, some polychromatic differentiation. Now, while the Greeks of the archaic period used color very lavishly, it appears that with the perfection of form the use of color was practised with more restraint and became, in the Periclean Age, a detail handled with as much delicacy and refinement as was the beautiful profile of the Doric echinus. The wonderful Pentellican and Parian marbles had, of course, an intrinsic quality and loveliness that the æsthetic Greek desired to preserve and enhance. But the Greek was always careful not to allow a delight in things beautiful to carry him into any senseless or unreasonable profusion by its indulgence. He therefore used color in the same refined manner in which he handled form and with equal results.



Shrine from Palace of Knossos
CRETE.

The colors generally used were red, blue, yellow, and green, but red and blue were the most prominent and used in almost équal proportions. No color was used in large fields, but was broken into bits and was alternated with the brilliant high light of Pentellic marble or relieved by the glint and shine of bronze, silver, or gold. Used thus the colors seen from a distance blended into a delightful monochrome. Some ancient traveller has described the aspect that the Acropolis presented to one approaching from Piræus as resembling a great iridescent pearl glistening in the white sunshine of Hellas.

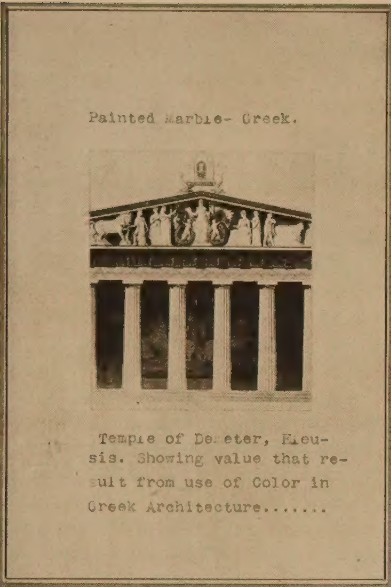
Color decoration of structural parts was particularly worked out in connection with the Doric order and, although they became traditional to a certain extent, they did not by any means bind the Greek architect as did the hard-and-fast rules of the Egyptians. The extreme simplicity of the Doric order has recently been accounted for by the fact that it was intimately bound up with expression in color, an expression that calls for simple rather than highly involved forms. The triglyphs seem to have been preferably of blue, the mutules of blue relieved by guttæ of gold. In the metope, if decorated by sculpture, the background was red. Various facias and cymas were decorated with running honeysuckle ornament in red or red and green upon the pure white marble.

In the case of the Pan-Athenaic frieze of the Parthenon the white figures of the procession stood out upon a blue background. This was also true of the figures upon the frieze inside the peristyle of the Theseum at Athens. In the case of the Theseum, however, there is every reason to believe that the figures were also relieved by color. The ceiling of the peristyle was painted blue and decorated with golden stars.

So far as I can find there is little ground for believing that color was used much below the capital of the order, and it appears to have been almost exclusively confined to the entablature, that is to say, to those parts of the structure that by virtue of their small dimensions and distance from the eye needed a definition not afforded in so vibrant a sunlight. In this way the Greek, so sensitive to the imperfections of sight which, as we know, he sought to correct by adoption of refinements in form, found a means for overcoming the effect of diminution and reduction produced by distance and to give his structure the aspiration that always results from a use of interesting form or color above the eye. If it was necessary for the Greek to make sensible and intelligible the various members of his entablature, no farther than they were from the eye of the beholder, how much more necessary it is for us to consider a similar treatment for the upper stories of our skyscrapers. In "flowering out" at the top with his color, the Greek architect only annunciated in terms of architecture a very potent beautiful law of nature and a law that before the time of the Greeks seems to have gone unheeded, as you will agree when you recall that the walls of the Egyptians and western Asiatic peoples presented an all-over, calico effect, with as much interest at any other place as at the top.

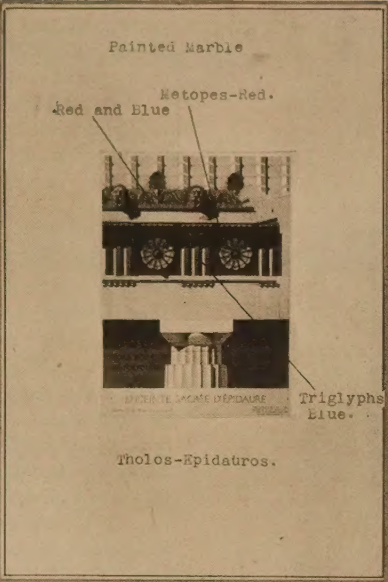
Now, while colored marbles were used in Greek work upon some occasions, this means of introducing color into architecture was far rarer than that of applied color. Two well-defined examples of such use are to be found, however, in the pre-Hellenic Lions' Gate at Mycenæ, where the triangular

Painted Marble- Greek.



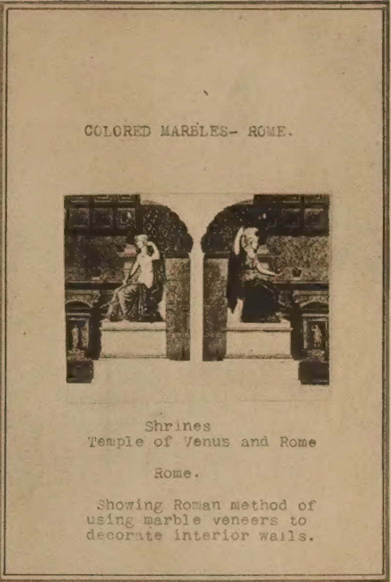
Temple of Demeter, Eleusis. Showing value that result from use of Color in Greek Architecture.......

Painted Marble


Metopes-Red.
Red and Blue
Triglyphs Blue.

Tholos-Epidauros.

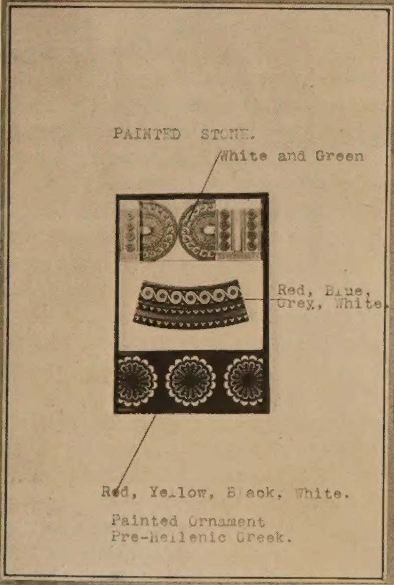
COLORED MARBLES- ROME.



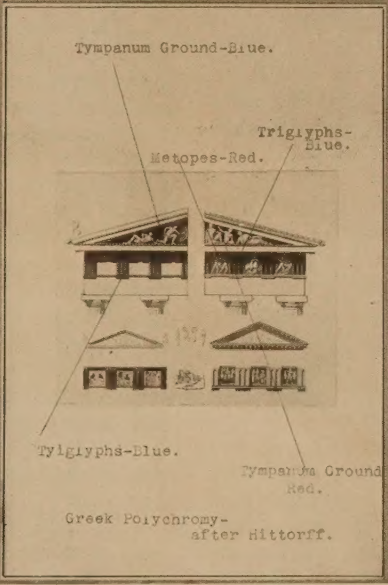
Shrines
Temple of Venus and Rome
Rome.

Showing Roman method of using marble veneers to decorate interior walls.

PAINTED STONE.

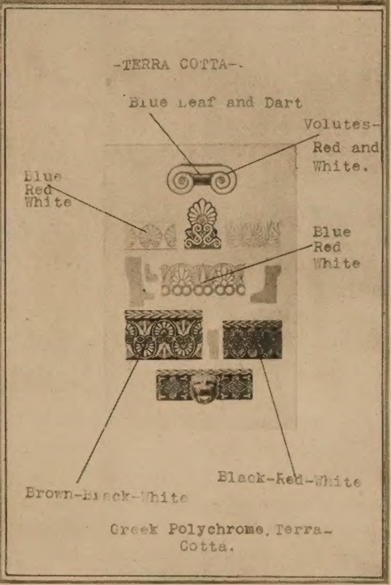


Painted Ornament
Pre-Hellenic Greek.


Tympanum Ground-Blue.
Triglyphs-Blue.
Metopes-Red.
Tyiglyphs-Blue.
Tympanum Ground Red.

Greek Polychromy-
after Hittorff.

-TERRA COTTA-.



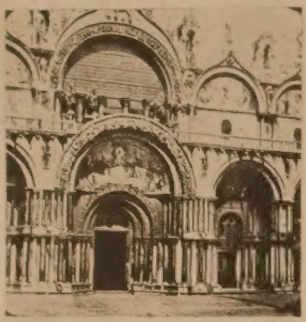
Greek Polychrome, Terra-Cotta.

block over the lintel is of green marble, and in the more familiar example of the Erechtheum, where the white figures of the frieze were made definite against a ground of black Eleusinian marble. The introduction of colored marble, porphyries, and granites into classic architecture, upon any large scale, seems to have been due to the Romans and that introduction to have dated from the Roman subjugation of Egypt.

It will not be necessary to go into detail to prove how completely this method of color introduction took hold of the Roman architect, or to enumerate the long list of buildings decorated in one way or another with marbles of exquisite beauty imported from almost every corner of the Roman world. I believe that it is no exaggeration to say that the whole system of architectural decoration made possible by using beautifully colored materials, a system brought to a very brilliant climax by the Byzantine decorators, dates from this Roman beginning. Rome is to-day full of precious materials imported to grace the buildings of that day. To be sure, most of them no longer embellish the buildings that they were imported to decorate. This is due to the early Christian habit of using the old pagan structures as quarries from which to filch materials for the erection of Christian churches. Many a Christian church contains interior colonnades the columns of which originally graced some pagan temple or basilica, and many a basilican mosaic presents beautiful marble disks sawn from the drums of old Roman columns.

Under the influence of the Christian church polychromatic decoration upon the interiors of churches was brought to a fine climax, and the achievements of the Byzantine mosaicists are among the artistic triumphs of the race, but with the development of beautifully colored interiors came also a decline in external coloration. This decline which had already set in during the empire operated at Byzantium to produce in Sancta Sophia one of the most beautifully

COLORED MARBLES and MOSAICS



Facade of Saint Marks,
Venice.

Showing use of Colored
Marbles and Mosaics upon
the Exterior............

decorated interiors that the world has seen, yet at the same time a very uninteresting exterior. The same observation may be made of the Tomb of Galla Placida or the Church of Saint Vitale at Ravenna.

Now while the early Christian and Byzantine buildings were generally colorful upon the interior and less so upon the exterior, this does not mean that the Italian, mediæval styles (which grew out of these vogues) present the same characteristics. One of Italy's most colorful buildings is Saint Mark's in Venice, and while that structure may generally be classed as a Byzantine building, it is to be noted that chronologically it belongs to a much later period than such a work of Byzantine art as Sancta Sophia.

Venice of all places was colorful and has produced not only colorful architecture but also a long list of painters famed as colorists. The Venetian love of color results from two facts: first, a beautiful geographical setting and, second, a long and constant commercial contact with the Orient. The exterior of Saint Mark's is as splendidly decorated as the interior. Structural parts are everywhere overlaid with shafts of porphyry and verde antico, crowned with capitals of alabaster or incrusted with bas-reliefs, carvings, and mosaics. I would have you realize that in this structure the Roman method of applying "skin-deep" loveliness comes to its fullest and most complete climax, and while there is much that assumes to be only applied decoration, there is much that masks under the guise of architectural form.

Now, while Venice has this supreme example of applied decoration, in which the colored work is executed in permanent materials, it was also the custom in Venice in mediæval days to apply paint to the façades of their beautiful stone palaces. In fact, the interesting Ca d'Oro Palace gets its name from the fact that it was made brilliant with color and gilt. While it has been recognized for years that some of the palaces show traces of paint, it was comparatively recently that the specifications for the coloring of this very façade were found by the superintendent of state archives in the papers of the procurator of Saint Mark's. While the document is extremely interesting in the matter of light that it throws upon mediæval technical processes, it is also one of our finest proofs of the practice of painted polychromy in mediæval times. There is no question as to just what parts of the façade were relieved by red, ultramarine, white, or gold.

What has been remarked of Venice in particular is in a degree true of Italy generally during the Romanesque and Gothic periods. The buildings of both ages present many examples of polychromatic variation accomplished both by means of the use of colored materials and by means of applied paint (oil or fresco). Well-known examples of the first class of variation are such churches as San Miniato and the Cathedral of Florence and various churches at Lucca, Pisa, Pistoja, and even as far east as Bologna. These buildings exhibit walls stripped or panelled in dark green and white, or dark green, black, white, or red marble, and relieved here and there by panels of brilliant mosaics upon gold grounds. With these very interesting examples of incrusted decoration we might also mention the campanile of Florence Cathedral, Santa Croce, Santa Maria Novella, Orvieto Cathedral, and many others.

As examples of the painted type of color variation should be mentioned such structures as the little church at Sparone, the Cathedral of Piacenza, and the Church of San Zenone at Verona, where we find distinct traces of applied color in the lunettes and porch of the principal entrance.

Now while we might expect color treatment in so colorful a land as Italy, we might be surprised to find color generally loved and used in the damp and somewhat gloomy northern France, or the almost perpetually foggy England. But it appears, nevertheless, that the use of color upon the exteriors in France dates back to Gallo-Roman times, and that it continued down to the time of Louis XIV, that is to say, until the influence of Palladianism was felt in France.

Viollet-le-Duc, who closely examined Notre Dame de Paris, found numerous evidences and traces of color upon that structure. Not only were the three doors of the façade with their tempana all painted and gilded, but the niches of the doors, the gallery of the kings, the arcades under the towers, and the great rose window were once radiant with color and gilding. The large gables of the transepts, also, show unmistakable evidences of painting. Similar remarks, according to Paul Sedille, might be made about most of the French churches of the thirteenth, fourteenth, and fifteenth centuries.

The glazed or enamelled pottery set in the façades or used on the roof as tiles or as crestings and finials and the gilded leadwork of the roof all contributed their quota to the color of the day and were used to enrich edifices both great and small, religious and secular. Wooden house façades with their chamfered and notched half-timbering and carved panels were illumined with bright colors.

During the Renaissance, due to Italian influence, enamelled terra-cotta was in great favor in France. The monuments of Florence, Bologna, Perugia, Pistoja, and all those cities made famous by Luca della Robbia or his successors were sources of inspiration. Girolamo della Robbia, grandnephew of Luca, was invited to France by Francis I, and he enriched with polychrome terra-cotta the façades of the celebrated Château de Bologne (Château de Madrid).

The solemn white walls that found their first champion in Italy in the person of Palladio were passed on to France by his successors and imitators, the Jesuits and Bernini. These men imitated the classics by copying their orders; size sufficed for grandeur; form was appreciated only when in monochrome. Thus we see that the classics were not revived and restored in all their phases, simply in their forms.

(*Continued on page* 384)

Editorial and Other Comment

American Church Architecture

THERE has been much written and even more said recently on the subject of our church architecture, and the Episcopal Church and other denominations have taken up the matter in a vigorous protest against the generally poor quality of church buildings, and organized for action toward their betterment.

The church of whatever denomination is nearly always a conspicuous landmark, and in every city and town in the country there are many examples of the way a church should not be built, looked at from any other point of view than that any place may be good enough for a house of worship.

There is no other great power for the advancement of spiritual welfare of a people that calls for a more intimate uniting of beauty of thought and beauty and fitness in its place of expression.

The old Gothic builders manifested in their ascending arches and towers and in the lovely detail in both interior and exterior the spiritual aspiration that dominated their ideas of worship, and even those beyond the pale and unresponsive to the purely religious appeal of these wonderful churches are yet moved by the dignity and perfect adaptation of these edifices for their purpose. The best art of mediæval times went into their building, the most skilled artisans gave of their best, and if not always, maybe, a labor of love combined with a feeling of reverence for the work in hand, there was apparently the pride of creation, of participation in the uplifting of a great monument of beauty.

We are a far cry from the spirit of the Gothic times, from the methods of building that prevailed in the days of the great Gothic cathedrals, but religion is still a power in the world, and houses of worship are still the centres of influence in many communities.

We are building Gothic churches to-day, and the style seems especially appropriate for the cathedral church, and in the hands of men steeped in the Gothic traditions the style takes on a noble and inspiring dignity.

Both Mr. Cram and Mr. Goodhue have given us worthy examples of modern Gothic, and they have long stood at the very front of the Gothic tradition in our contemporary church architecture.

In New England, where the Wren influence gave us so many lovely churches of quiet charm and beauty of proportion, we find models that embodied the old Puritan wish for churches that bespoke the greater simplicity and austerity of their worship, the things that marked the development of religion in the colonies.

All over the country little spires of village churches rise up above the surrounding shops and homes, and many of them, viewed from a distance, add a picturesque and homely charm to the landscape. But too many of them, alas, may only be viewed with composure and kind tolerance from afar, for near by they become horrible examples of about the worst architecture in the community.

No doubt the local building committees are chiefly responsible for this condition, and to the untrained a church is a church, no doubt, and that is enough. The little church, no matter how poor the congregation, may quite easily be made beautiful, and beauty and worship should go hand in hand.

We hope to have better things from the very fact that the church people themselves have realized the situation and are taking the lead in the demand for better design.

There is a tendency here and there in modern church building toward the combination of the church with a supporting business structure and the putting together under one roof all the many-sided activities that the up-to-date church involves.

One of the first enterprises of this kind was in New York City, the well-known Judson Memorial Church on Washington Square, designed by Stanford White, a notably beautiful church combined with a wonderfully planned apartment hotel. There is now being erected in Chicago a large church that will combine the house of worship with an extensive office-building.

These, of course, are for a large city. Our greatest need for reform is in the small-town church, and the signs of the times give us hope that the future will show a marked advance in this field of architecture.

Lloyd Warren

THERE are always men who are quietly and unobtrusively doing great public service, who are giving their means and their culture in an unselfish effort to help others, to make better understood the things that advance art and make more useful citizens. Among these men few will be more missed than Lloyd Warren, an architect, whose tragic and most untimely death is regretted by all who have at heart the ideals for which he so valiantly and generously worked.

Of his work in behalf of The Beaux Arts Institute, Mr. Cortissoz wrote in *The Tribune:*

"The Beaux Arts Institute and the School of Sculpture, Painting and Interior Decoration which Mr. Warren founded have been continuous influences for beauty in architecture and for a broader vision of all its problems. That American architecture to-day ranks with the best in the world is considerably due to their force. Through their medium the ablest architects of the country, as generous volunteers, have directly aided and developed the rising generation of architects. Chance has been given to the draftsman of talent in any part of America to receive the criticism and training which he needed. Such beauty as this labor of love on the part of Mr. Warren has created is a precious gift to the people of America and it deserves appreciation by the public as well as by the men of his profession and a memorial befitting its lasting worth."

Mr. James Gamble Rogers, the architect of the beautiful Harkness Quadrangle at Yale, said of him:

"Mr. Warren worked hard and faithfully in every department of the profession that he so greatly honored, but it was to the development of the Society of Beaux Arts Architects and the Beaux Arts Institute that his life-work was dedicated. So sincerely did he labor that now, while it may no longer receive his support and wise counsel, it has become inevitably an established organization so firmly founded as to make it in the United States as important in its relation to architectural education as is the Ecole des Beaux Arts in Paris.

"In the great influence of Mr. Lloyd Warren's example we have presented what a capable and highly intelligent man of means may accomplish—a man of high ideals, of great force of character, with the means to further his visions and make them tangible and valuable realities. Other men in other fields of education may well be inspired to follow so fine an example, and to lend their wealth and their abilities to the furthering of a great purpose, in exactly the way Mr. Warren did.

"From his first connection with the Society of Beaux Arts Architects, and at a time when it was at best but a social architectural organization, his clear vision made it possible to discern the great possibilities that might be evolved from a group of that kind. With infinite patience and at the expense of much time, Mr. Warren perfected an organization which to-day bends all of its energies and influence toward the education in architecture of the younger men in the profession."

And the following is from another friend and architect, John Mead Howells:

"It can be said without risk of platitude, that since reaching the age of manhood, Lloyd Warren has given his life and activities for other people. He did this advisedly, and while the rest of us were working professionally Warren had made up his mind to help the type of young man who wanted to study architecture, but could not, because he was without money and opportunity. Of these young students who profited by his organization and help there were hundreds, even thousands—they and their work are Lloyd Warren's monument to-day.

"The Beaux-Arts Institute, of which Mr. Warren was the creator and director, grew up around his generous sacrifices and endeavor, but it was not he that built it. It was the hundreds of students who asked hungrily for what he offered them. But for his help they had no one to turn to for an education and advice. He made it possible for these young men to send their work to the Beaux-Arts Institute and have it judged and criticised for nothing by groups of leading architects, who gave their time at Warren's instigation, for these architects loved him and knew that he was not asking anything of them that he was not giving himself."

Ernest Peixotto, the writer of the following tribute, was intimately associated with Mr. Warren in the Beaux Arts School of Design as the director of the Department of Mural Painting and also with the work of the A. E. F. Training Centre at Bellevue, France. Mr. Peixotto served as a captain overseas, and has been made a member of the Legion of Honor for his work in behalf of France.—Ed.

"By the sudden and most regrettable death of Lloyd Warren, the cause of architectural education in this country has received a very severe blow and has lost one of its leading spirits and one of its most devoted and valuable friends. The editor of Architecture has asked me to write a brief tribute to his memory and, while I feel that this tribute would come more fittingly from a member of his own profession, I cannot resist, for, during the past few years, I have been associated with him in three of his most important educational activities: the A. E. F. Art Training Centre at Bellevue, France, The Beaux-Arts Institute of Design in New York, and the proposed School of Fine Arts in Fontainebleau.

"To each one of these works he brought that careful attention to detail, that spirit of service and self-sacrifice, that quiet devotion which, though not generally recognized by those who knew him slightly, yet won him the admiration and high esteem of all those who knew him at closer range. A bachelor, with the means at his disposal to lead the life of a dilettante, he nevertheless devoted at least a portion of every day to the preparation of his papers and his programmes and to his work among the students, many of whom he personally befriended.

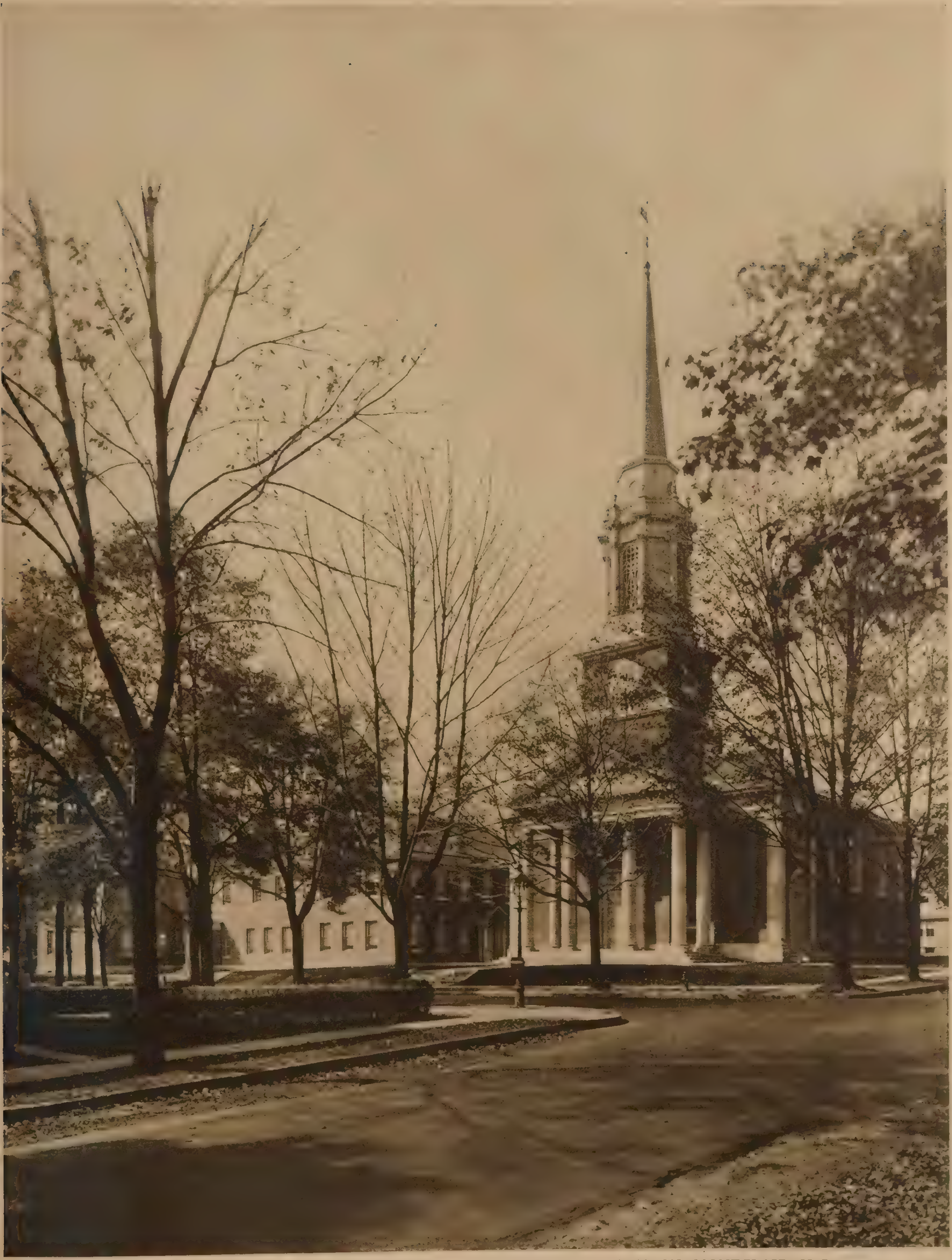
"At Bellevue his work among the soldier-artists awaiting repatriation after the armistice was considered so important that, for it, the French Government conferred upon him the red ribbon of the Legion of Honor; while the success of the Beaux Arts Institute of Design is due to a large extent to his untiring efforts in its behalf.

"Founded less than a decade ago, under the auspices of the Society of Beaux Arts Architects, and upon the competitive system used in the Ecole des Beaux Arts in Paris, this institute has become unique, I believe, among the educational institutions of our country. And, under Mr. Warren's successful directorship, its influence has become so widespread that now it enrolls a thousand students in its architectural department and its monthly programmes are being used by fifty-seven different ateliers of which twenty-six are schools of architecture in our leading universities. The spirit of competition created by its monthly 'judgments' has undoubtedly raised the standard of architectural training throughout our land, stimulating the imagination of the student and quickening his sense of design.

"The programmes of its Department of Mural Painting are likewise being used by a number of our leading art schools and colleges, and are undoubtedly tending to stimulate a serious interest in this, at present, much-neglected art, while its Department of Sculpture is certainly the largest school of its kind in the country with several hundred students enrolled upon its books.

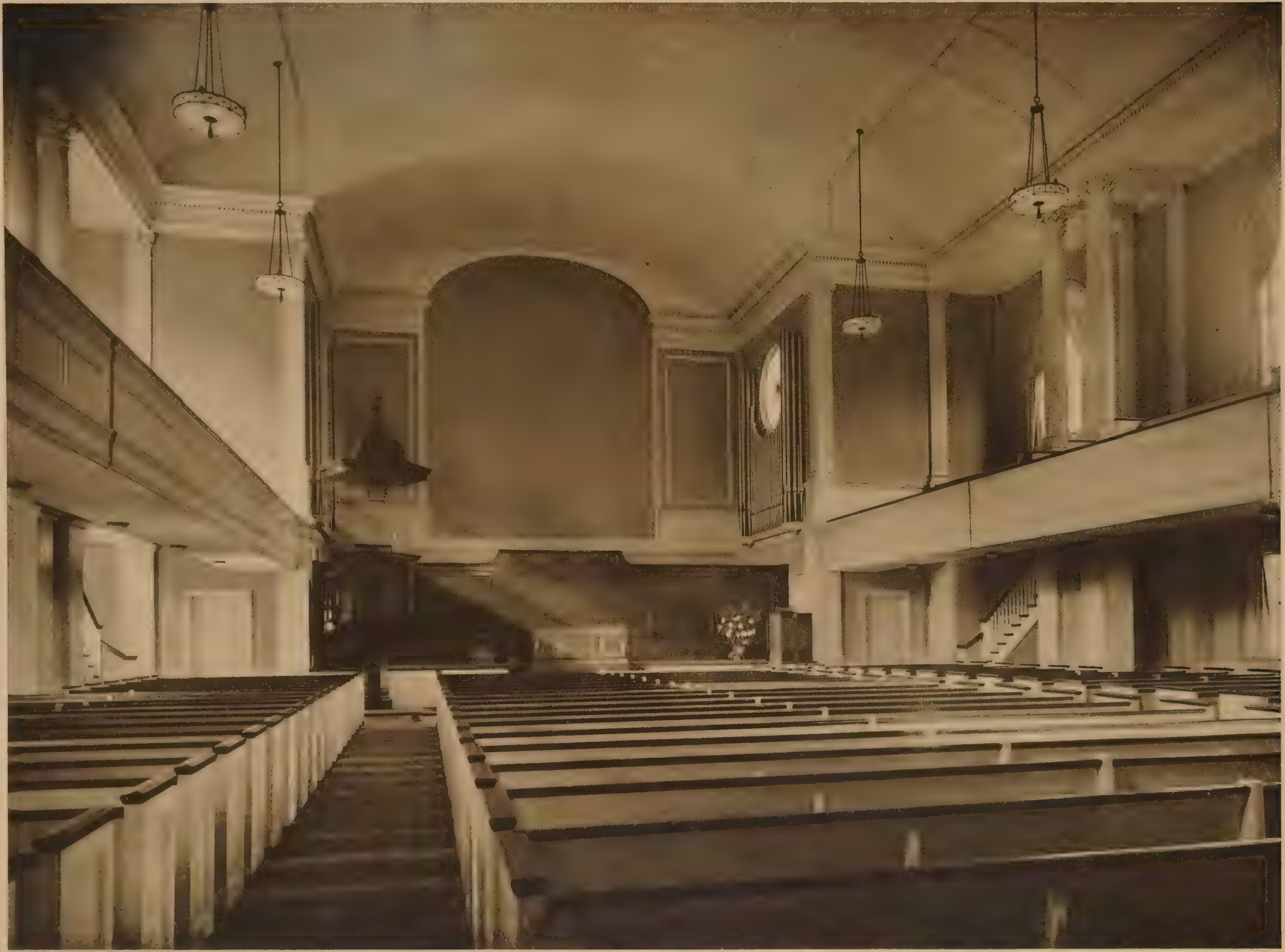
"These splendid results are due, as I have said, in a large measure to Mr. Warren's efforts, backed, as they were, by an ever-widening group of architects, painters, and sculptors who give their time and their service to the work. He also founded the Prix de Paris, which enables its recipient to spend three years in France as a pupil of the Ecole des Beaux Arts while his further love for France and his appreciation of the meticulous French methods of teaching also enlisted his early support for and interest in the Fontainebleau School of Fine Arts for painters and archictects, which in all probability will open next summer in a wing of the historic Palace itself, placed at the disposal of American students by the French Government.

"And so it will be seen that Lloyd Warren was ever unselfishly striving to aid his young compatriots and, had his life been spared, would have continued to do his very important work. His place in that work will indeed be hard to fill, but his friends and associates are convinced that the best memorial that they can rear to his memory will be the continuance of the work that he so nobly began and for which his name will long be cherished and remembered."

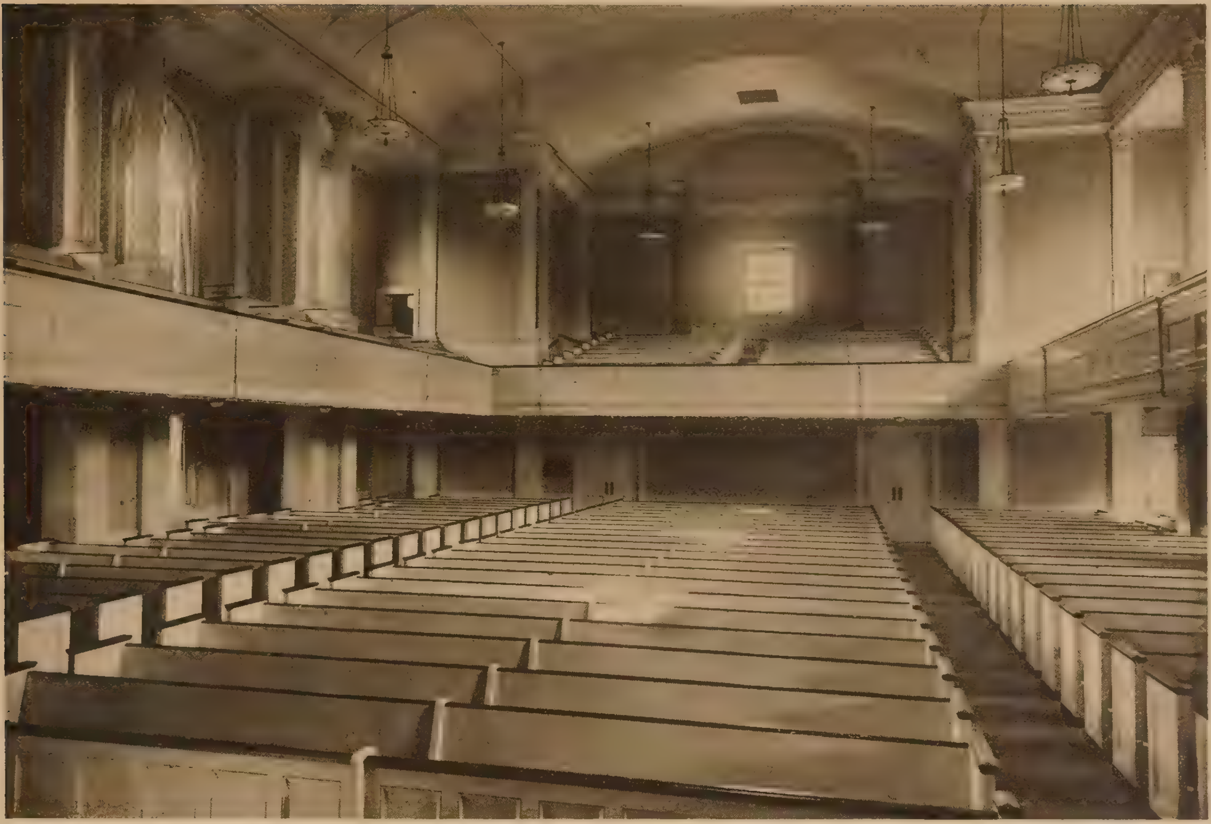


CHURCH AND SERVICE BUILDING, CENTRAL PRESBYTERIAN CHURCH, MONTCLAIR, N. J.

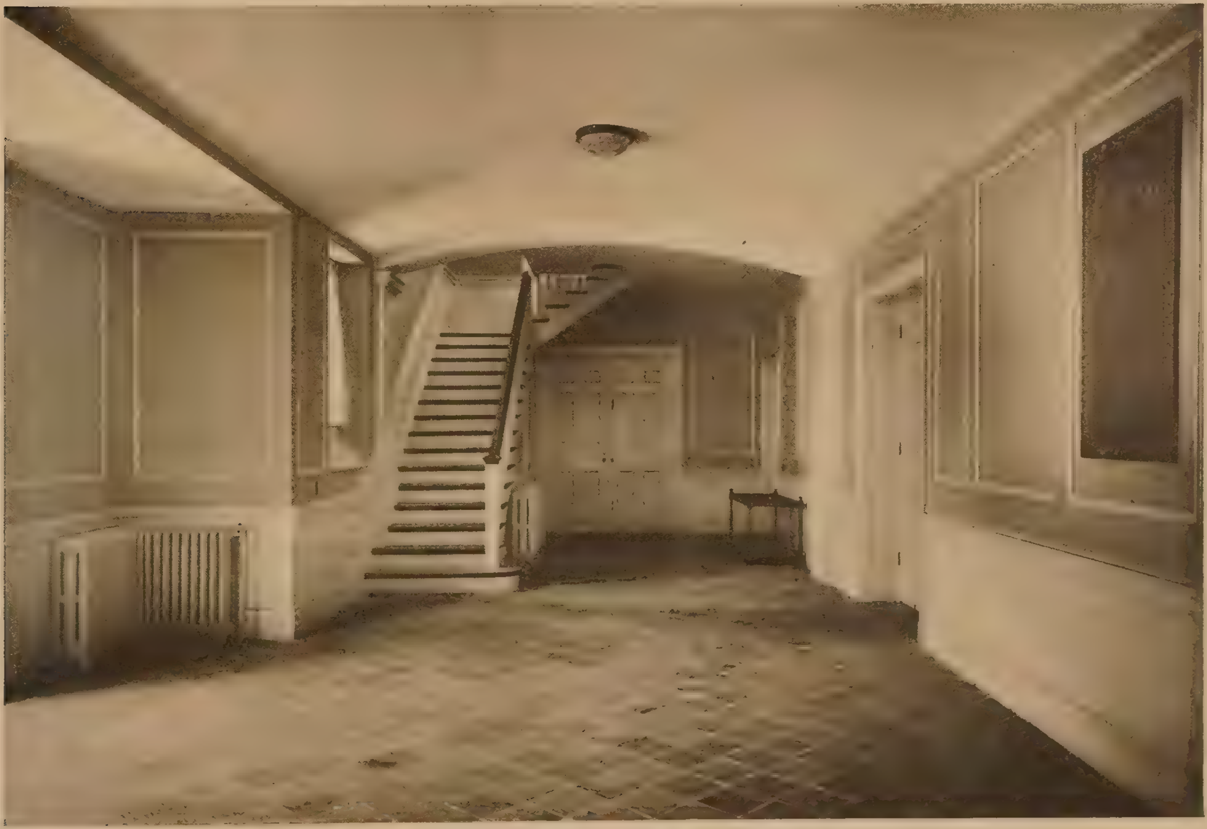
Carrère and Hastings, Architects. Shreve, Lamb and Blake, Associated.



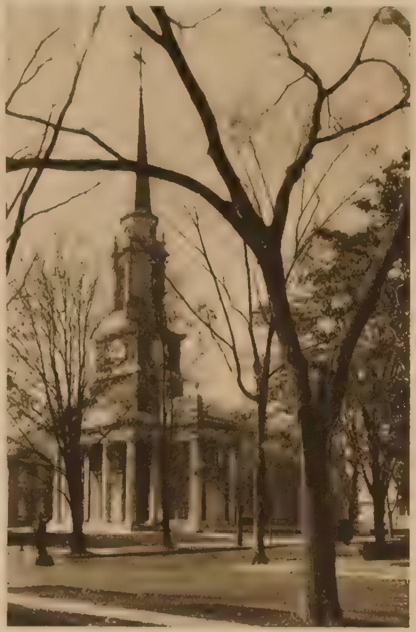
INTERIOR, TOWARD PULPIT, CENTRAL PRESBYTERIAN CHURCH, MONTCLAIR, N. J. Carrère and Hastings, Architects. Shreve, Lamb and Blake, Associated.

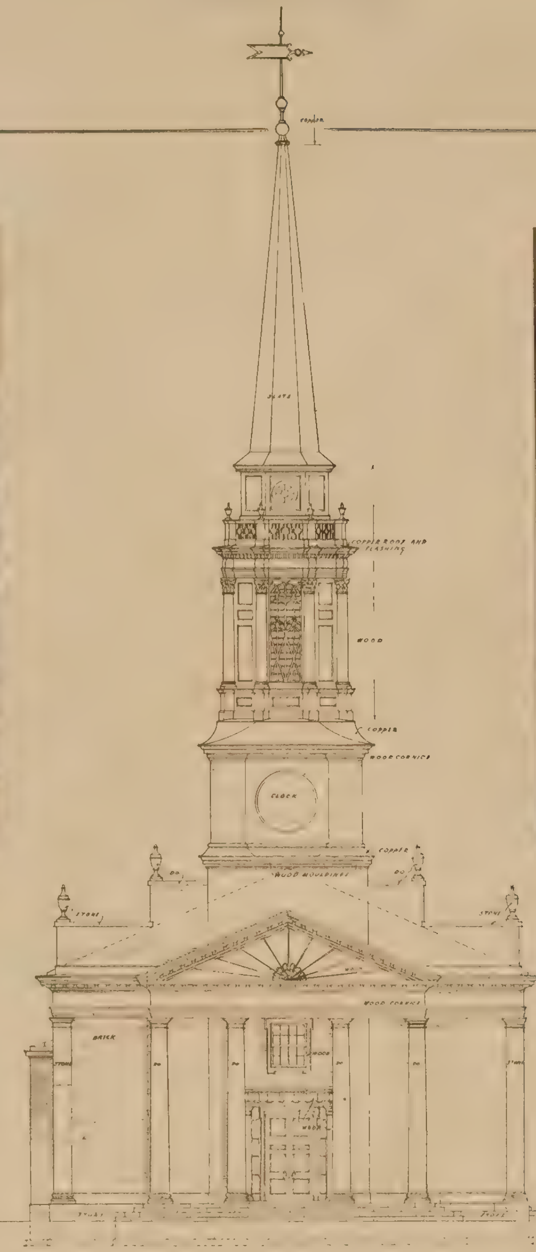


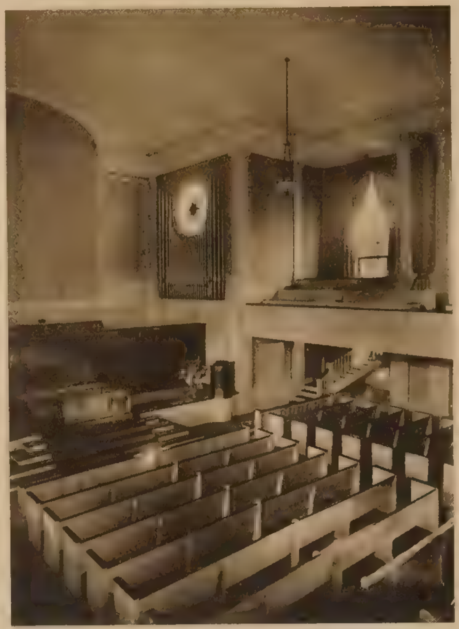
INTERIOR, TOWARD ENTRANCE.



LOBBY, CENTRAL PRESBYTERIAN CHURCH, MONTCLAIR, N. J.
Carrère and Hastings, Architects. Shreve, Lamb and Blake, Associated.







FRONT ELEVATION - CHURCH
SCALE 1/8 = 1 0"
CENTRAL PRESBYTERIAN CHURCH
MONT CLAIR N J

CARRERE AND HASTINGS
ARCHITECTS
SHREVE LAMB AND BLAKE
ASSOCIATED
36 VANDERBILT AVE NEW YORK

JOB No	DRAWING No
496	53
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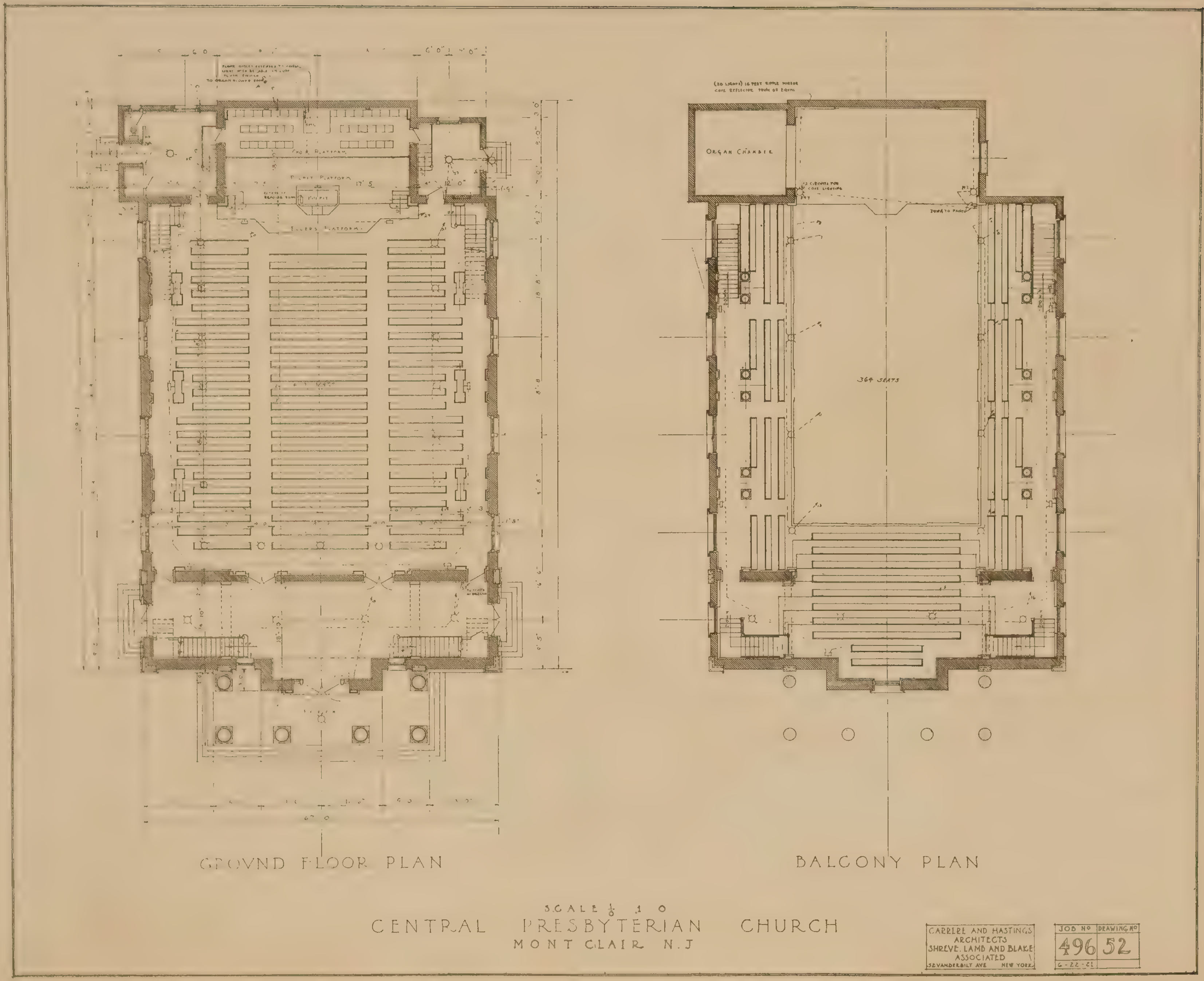
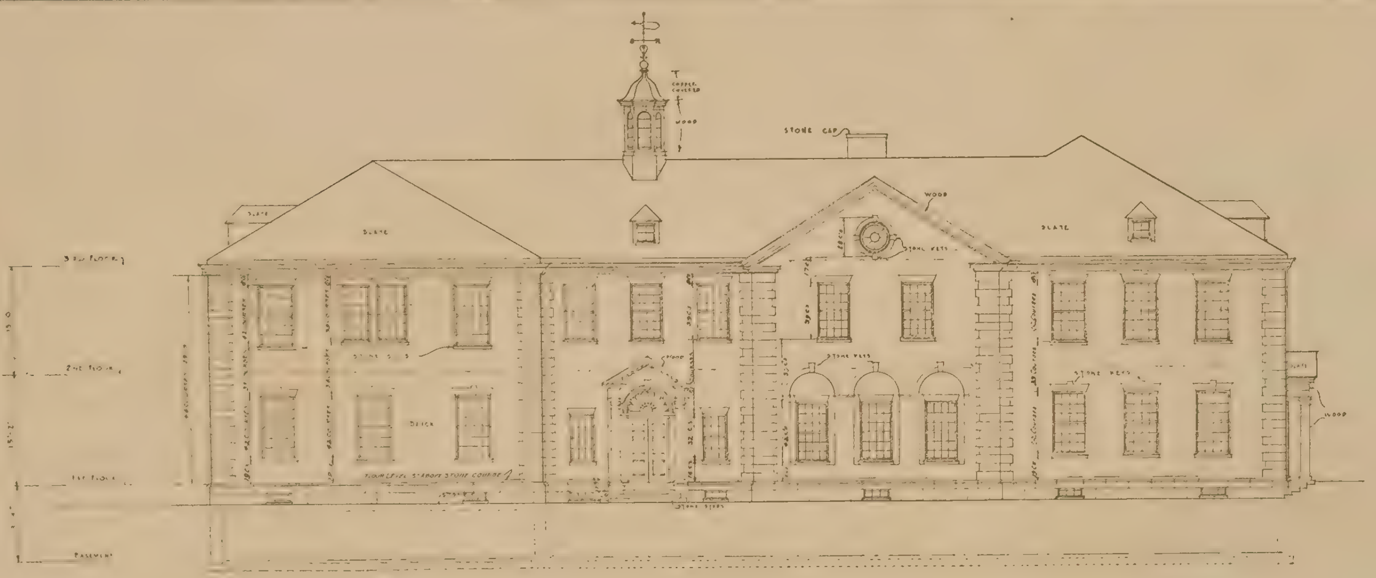
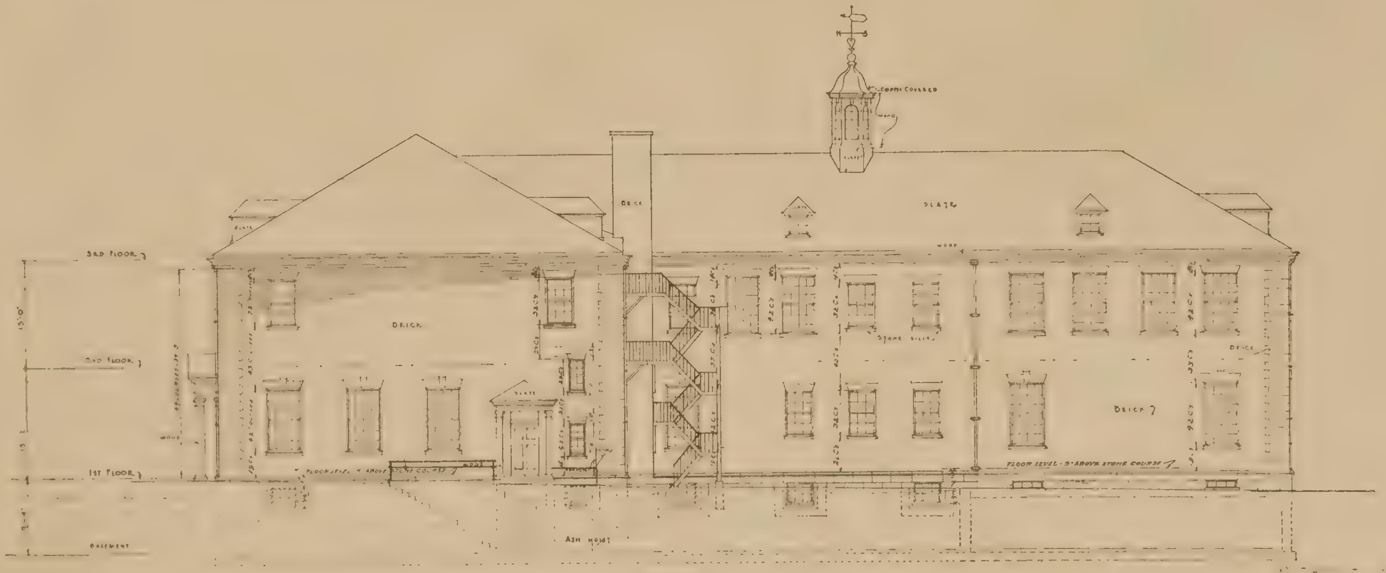

GROUND FLOOR PLAN
CHOIR PLATFORM
PULPIT PLATFORM 17' 5"
PULPIT
ELDERS PLATFORM
BALCONY PLAN
(20 LIGHTS) 16 TEST RIPPLE MIRROR COVE REFLECTOR TRIM OR EQUAL
ORGAN CHAMBER
2 CIRCUITS FOR COVE LIGHTING
DOWN TO PANEL
364 SEATS
SCALE 1/8" 1' 0"
CENTRAL PRESBYTERIAN CHURCH
MONT CLAIR N.J
CARRERE AND HASTINGS
ARCHITECTS
SHREVE, LAMB AND BLAKE
ASSOCIATED
52 VANDERBILT AVE NEW YORK
JOB No
DRAWING No
496
52
6-22-21



EAST ELEVATION



WEST ELEVATION

SERVICE BUILDING
CENTRAL PRESBYTERIAN CHURCH ·
MONTCLAIR ~ N·J·

496
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9-21-21
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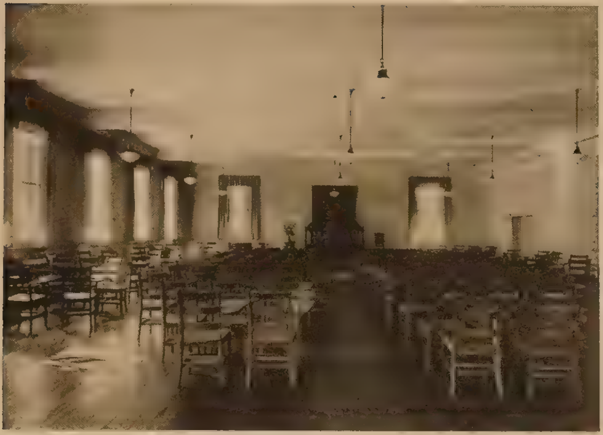
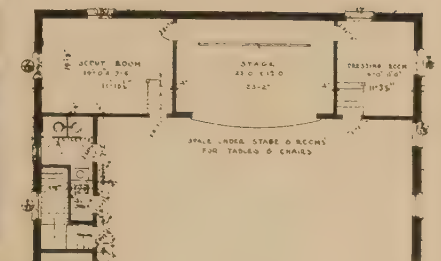
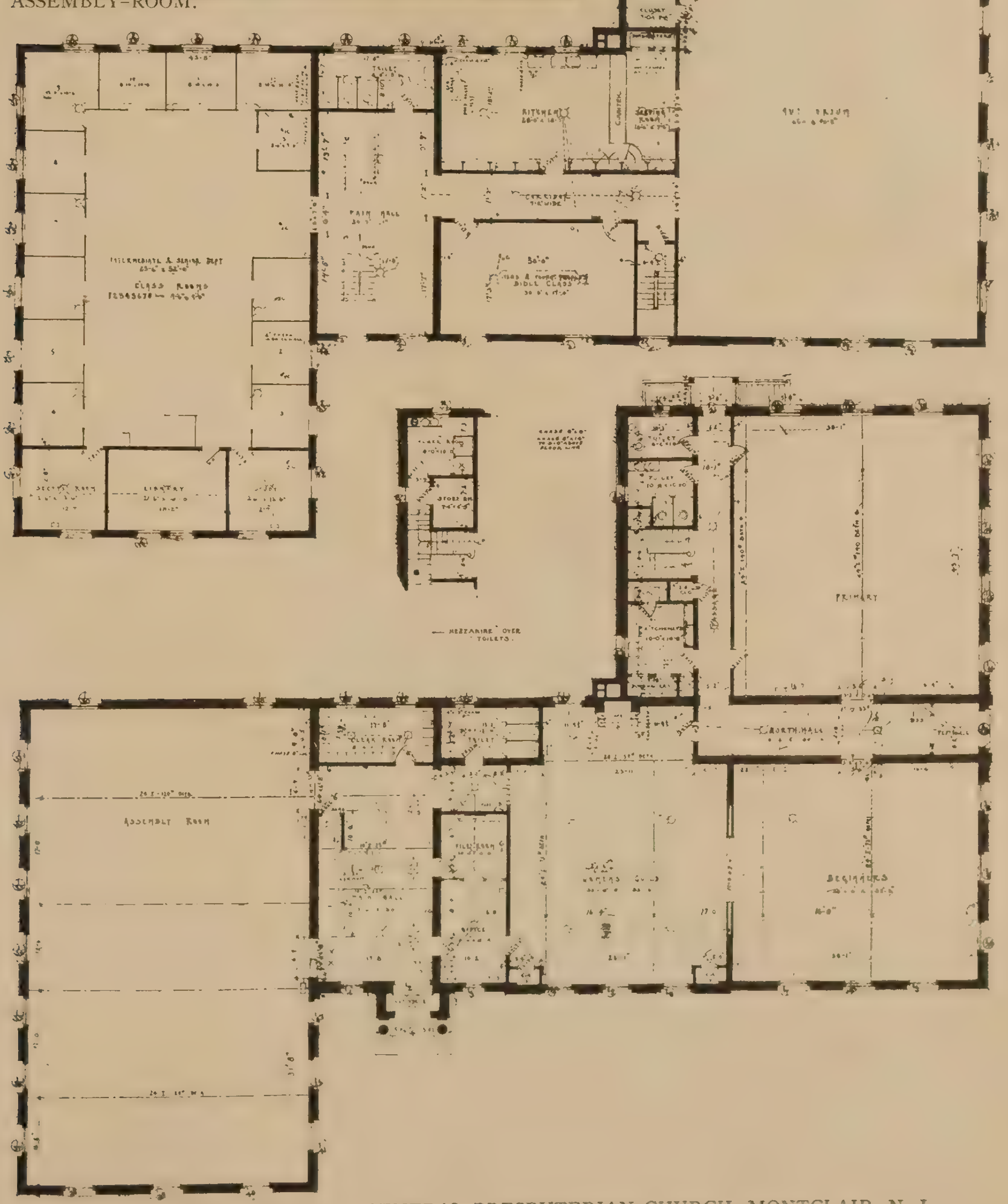
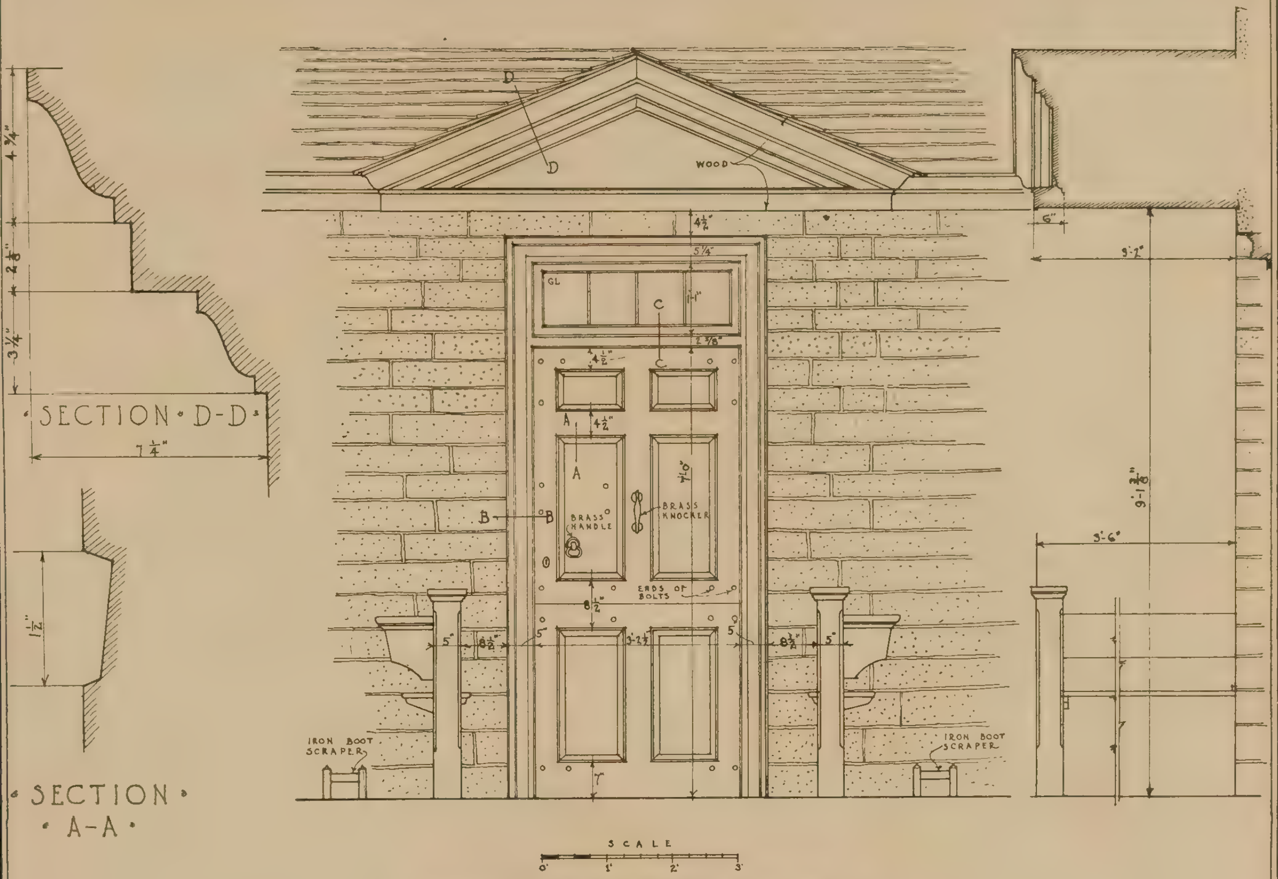


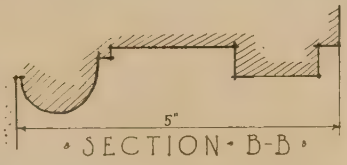
ASSEMBLY-ROOM.

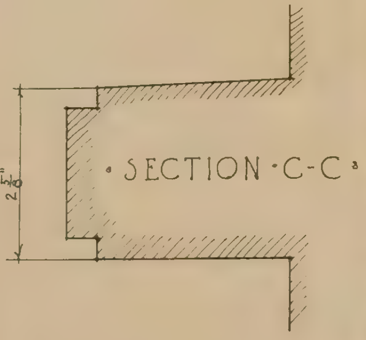



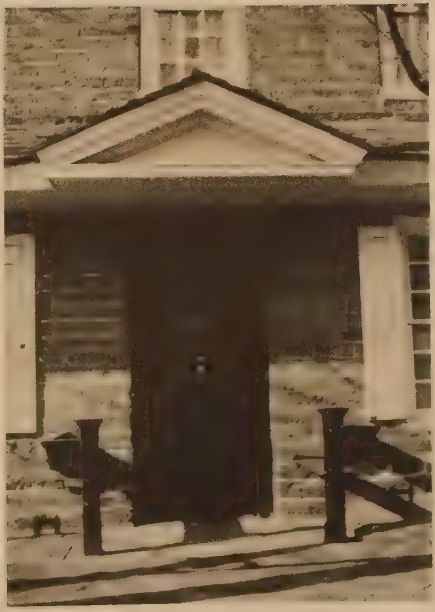
PLANS, SERVICE BUILDING, CENTRAL PRESBYTERIAN CHURCH, MONTCLAIR, N. J.

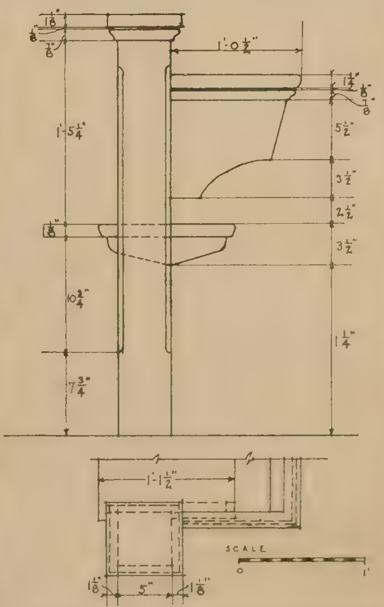
Carrère and Hastings, Architects. Shreve, Lamb and Blake, Associated.







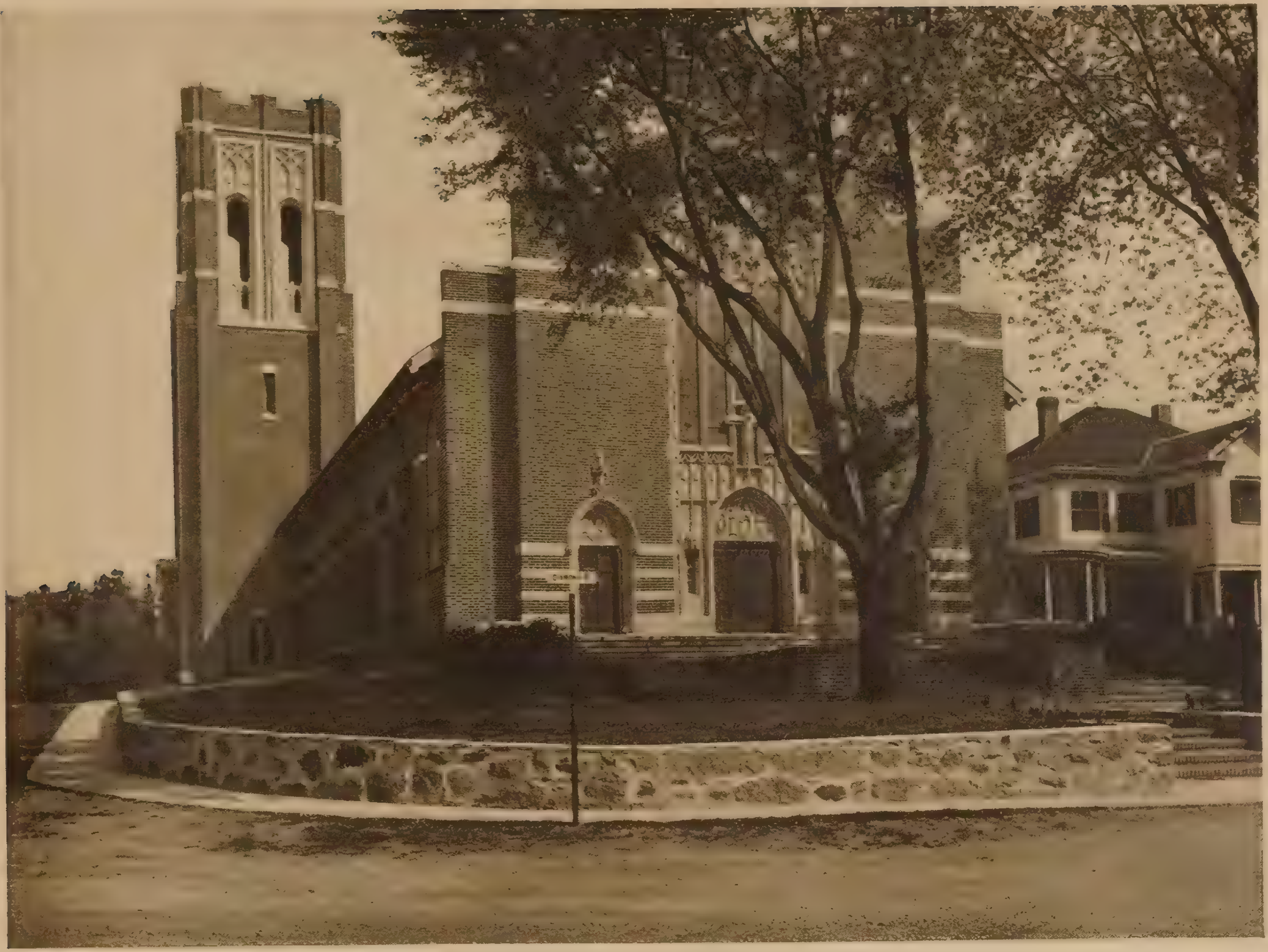


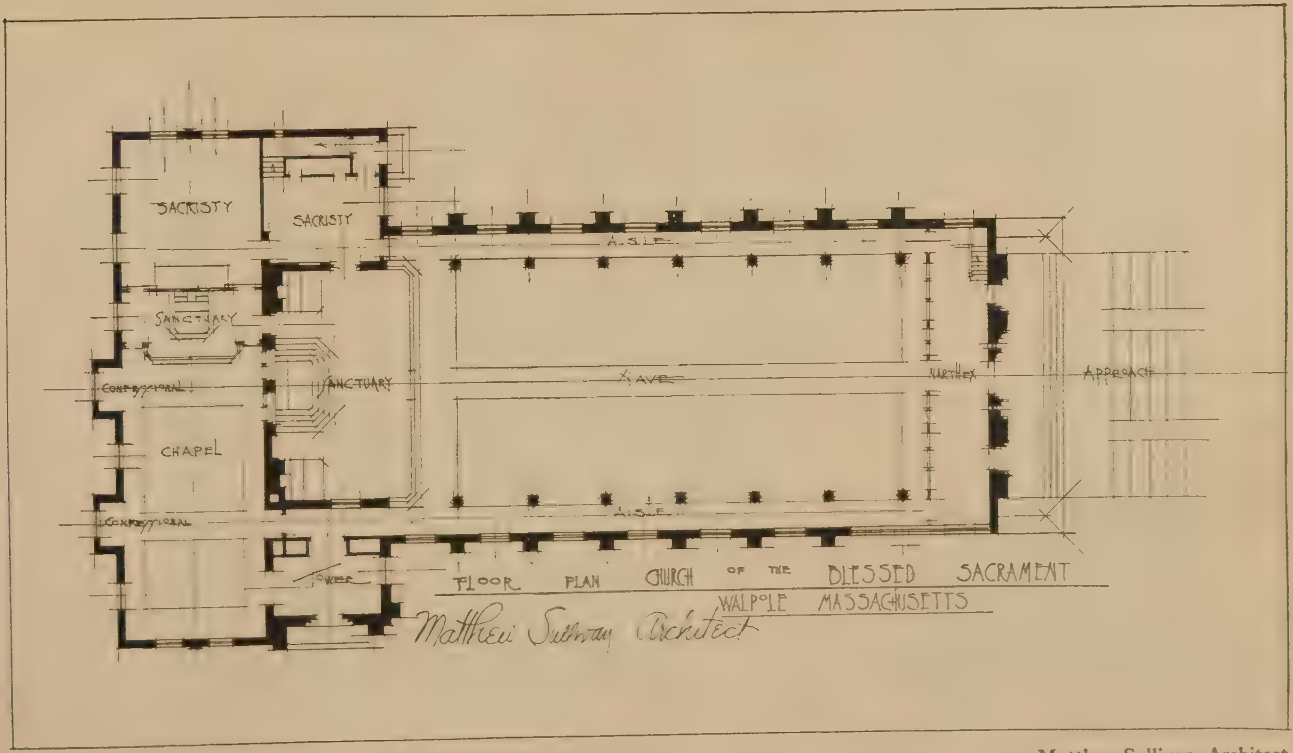


· EARLY · ARCHITECTURE ·
· OF · GERMANTOWN · PA. ·
· CIRCA · 1768 ·

· DOORWAY ·
· OF · THE · "JOHNSON" · RESIDENCE ·
· GERMANTOWN · PA. ·

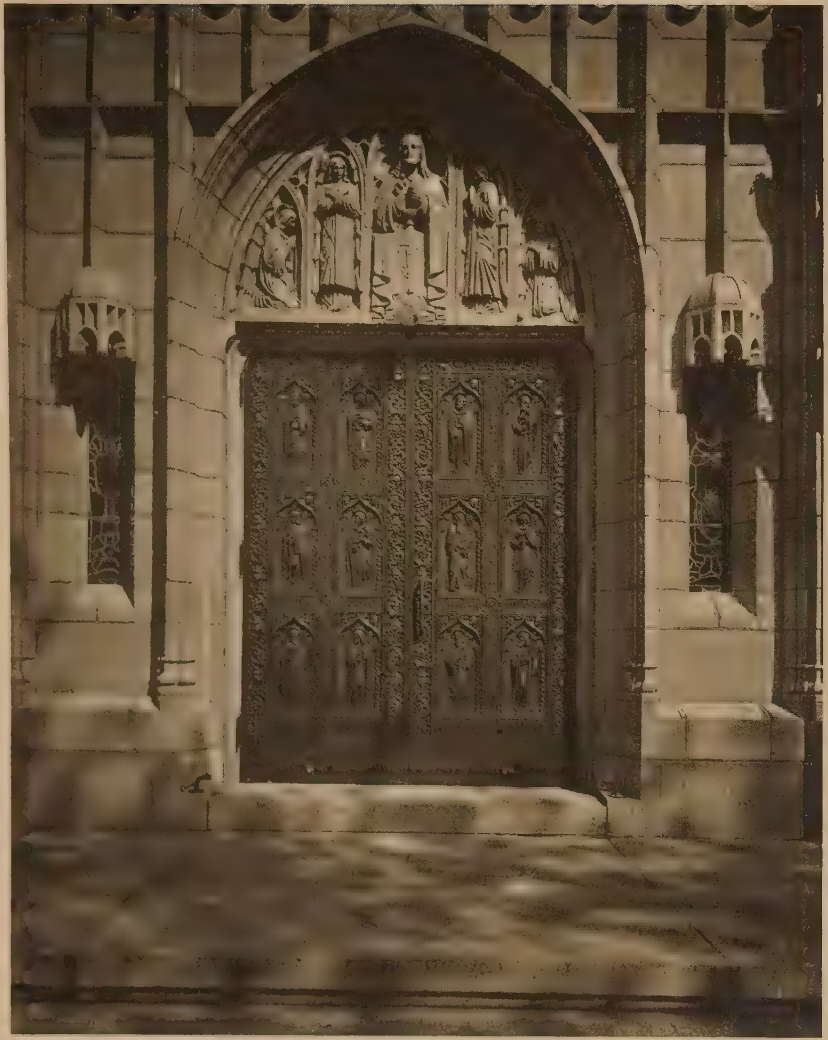
· MEASURED · AND ·
· DRAWN · BY ·
· Daniel W. Weiny



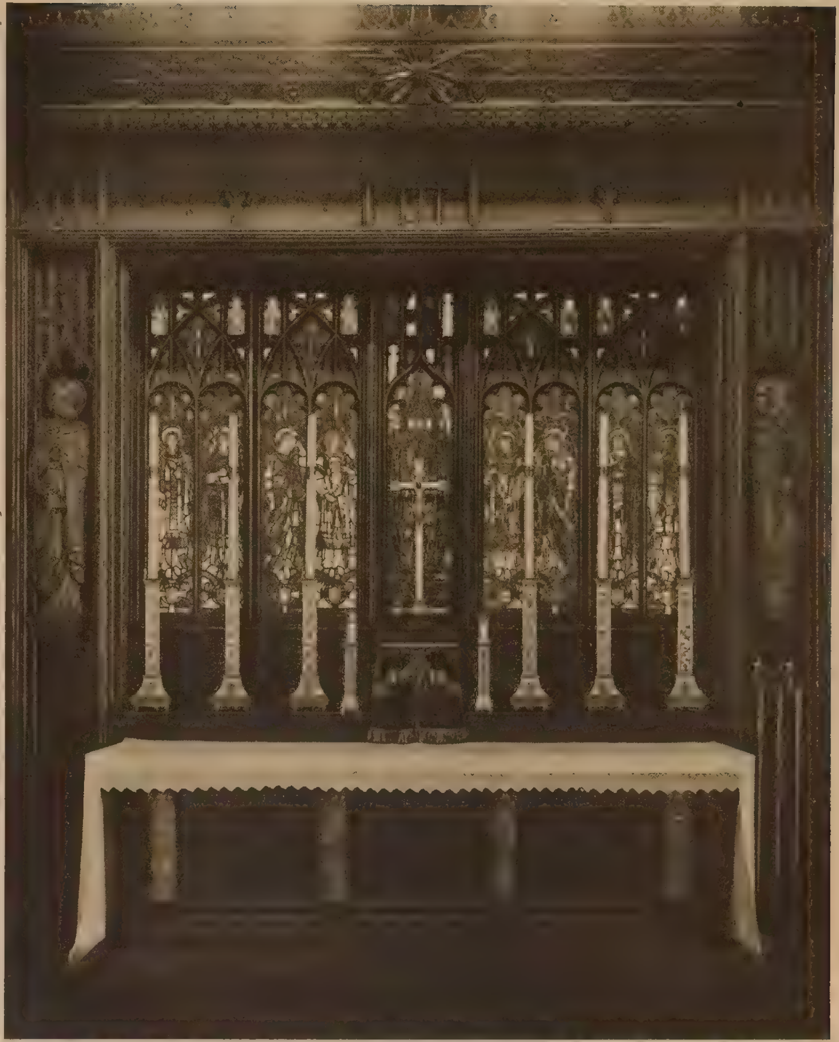


CHURCH OF THE BLESSED SACRAMENT, WALPOLE, MASS.

Matthew Sullivan, Architect.



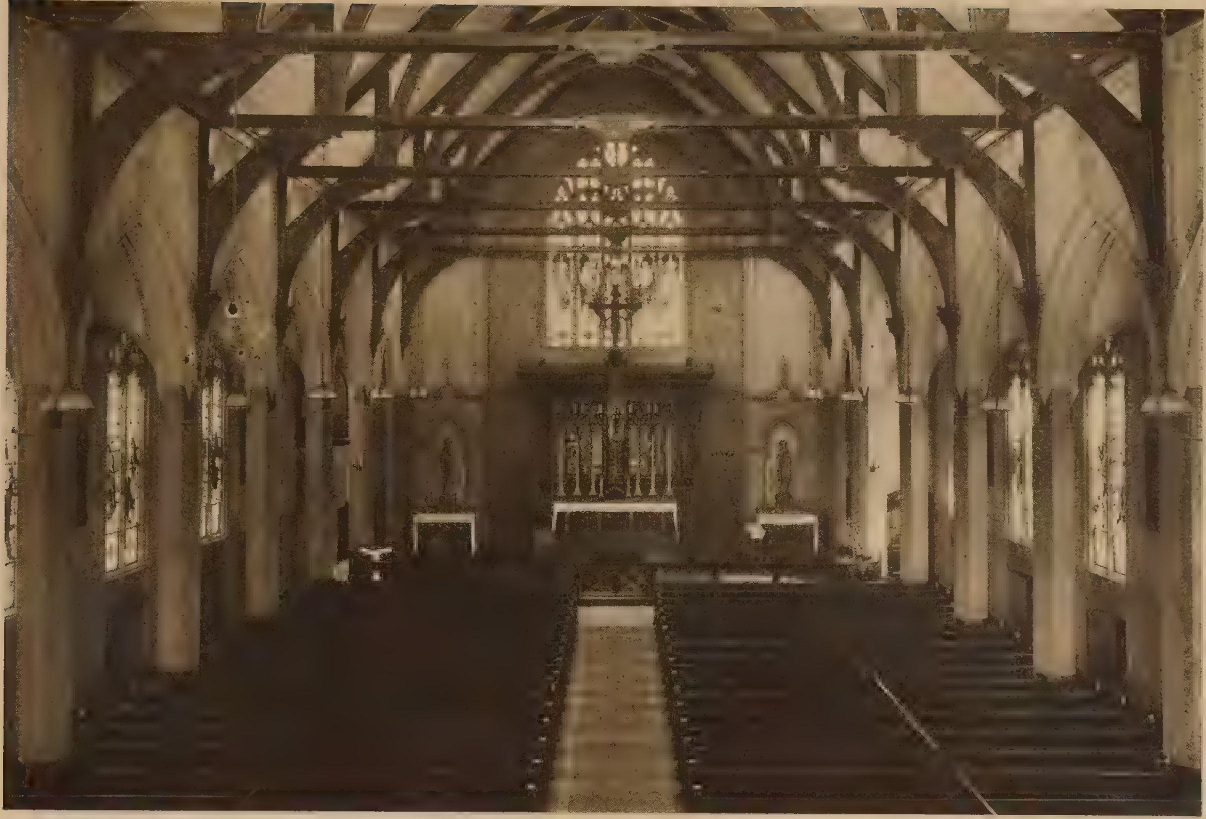
MAIN ENTRANCE.



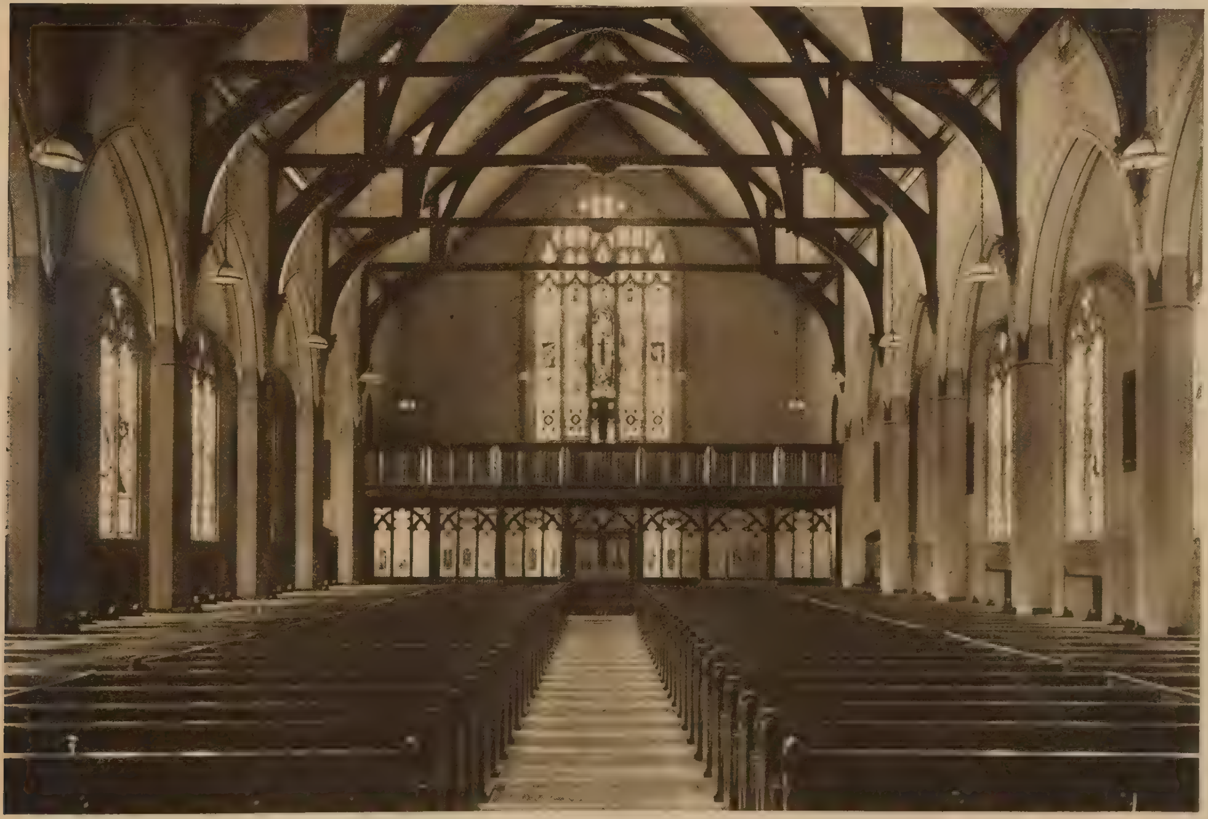
DETAIL OF ALTAR.

Matthew Sullivan, Architect.

CHURCH OF THE BLESSED SACRAMENT, WALPOLE, MASS.



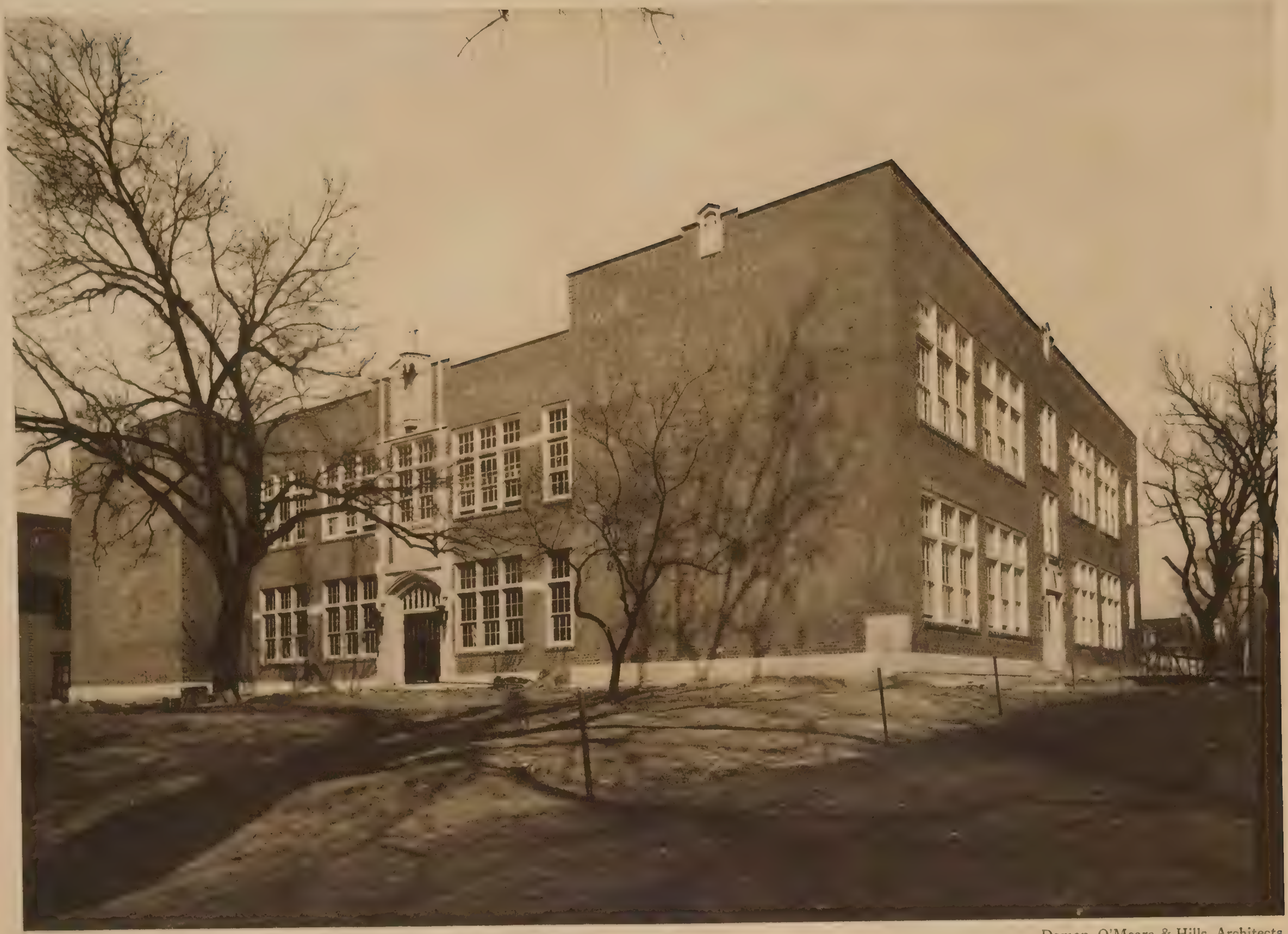
INTERIOR, TOWARD SANCTUARY.



INTERIOR, TOWARD ENTRANCE.

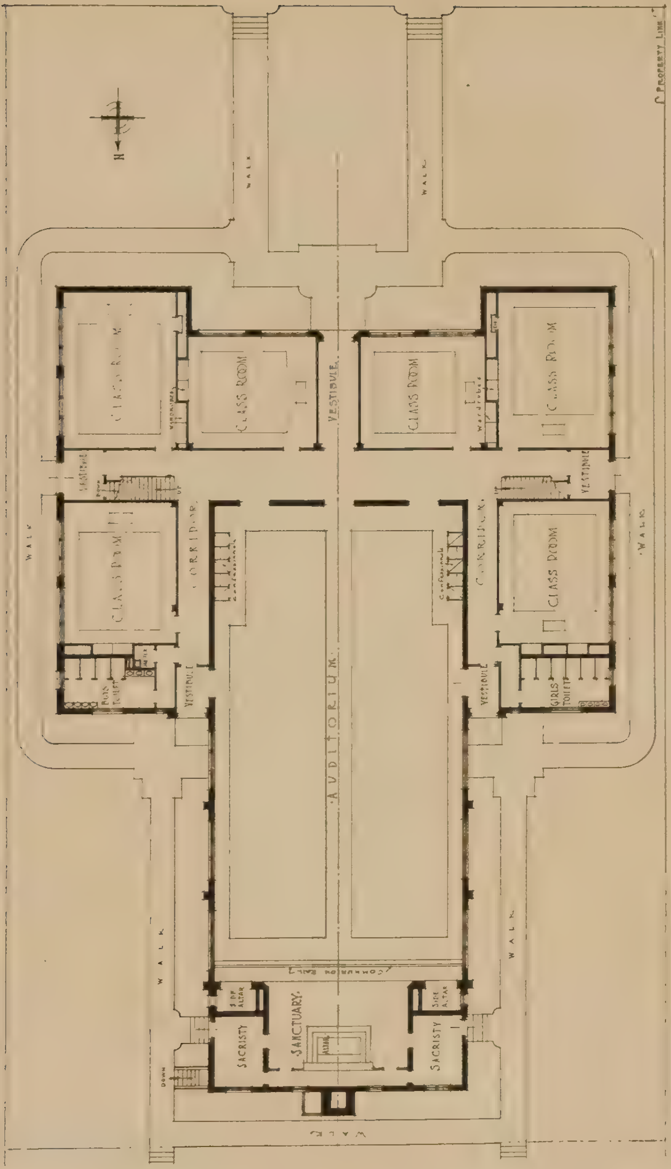
Matthew Sullivan, Architect.

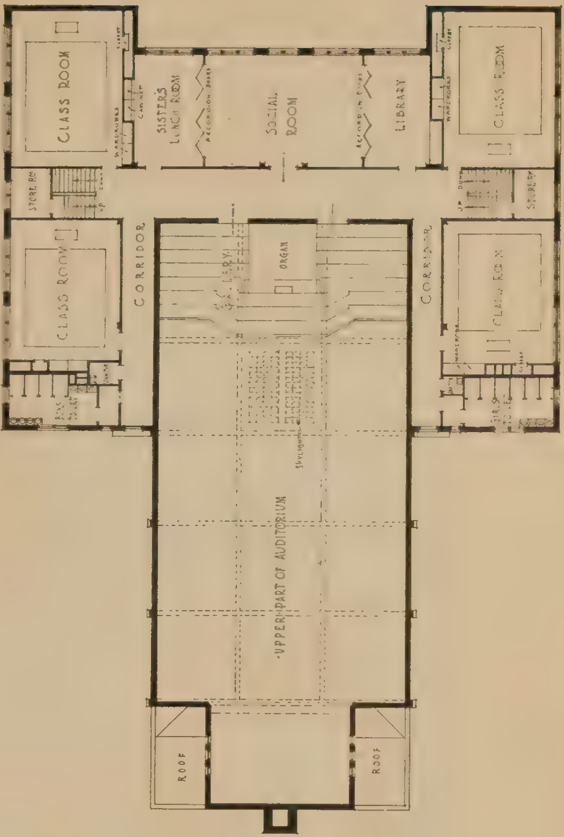
CHURCH OF THE BLESSED SACRAMENT, WALPOLE, MASS.

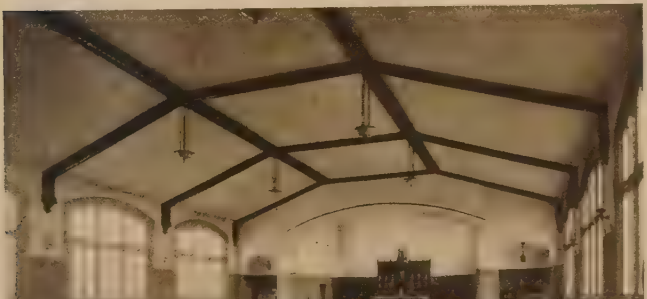


CHURCH AND SCHOOL OF ST. LAWRENCE, R. C., MINNEAPOLIS, MINN.

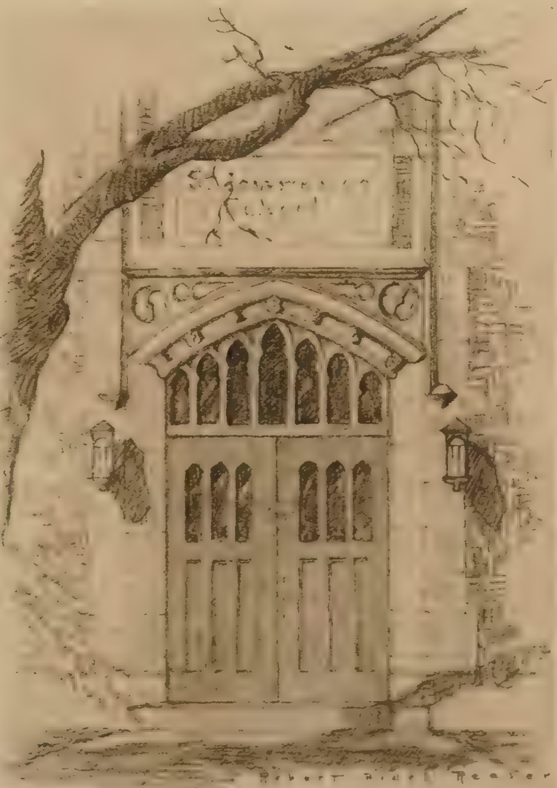
Damon, O'Meara & Hills, Architects.





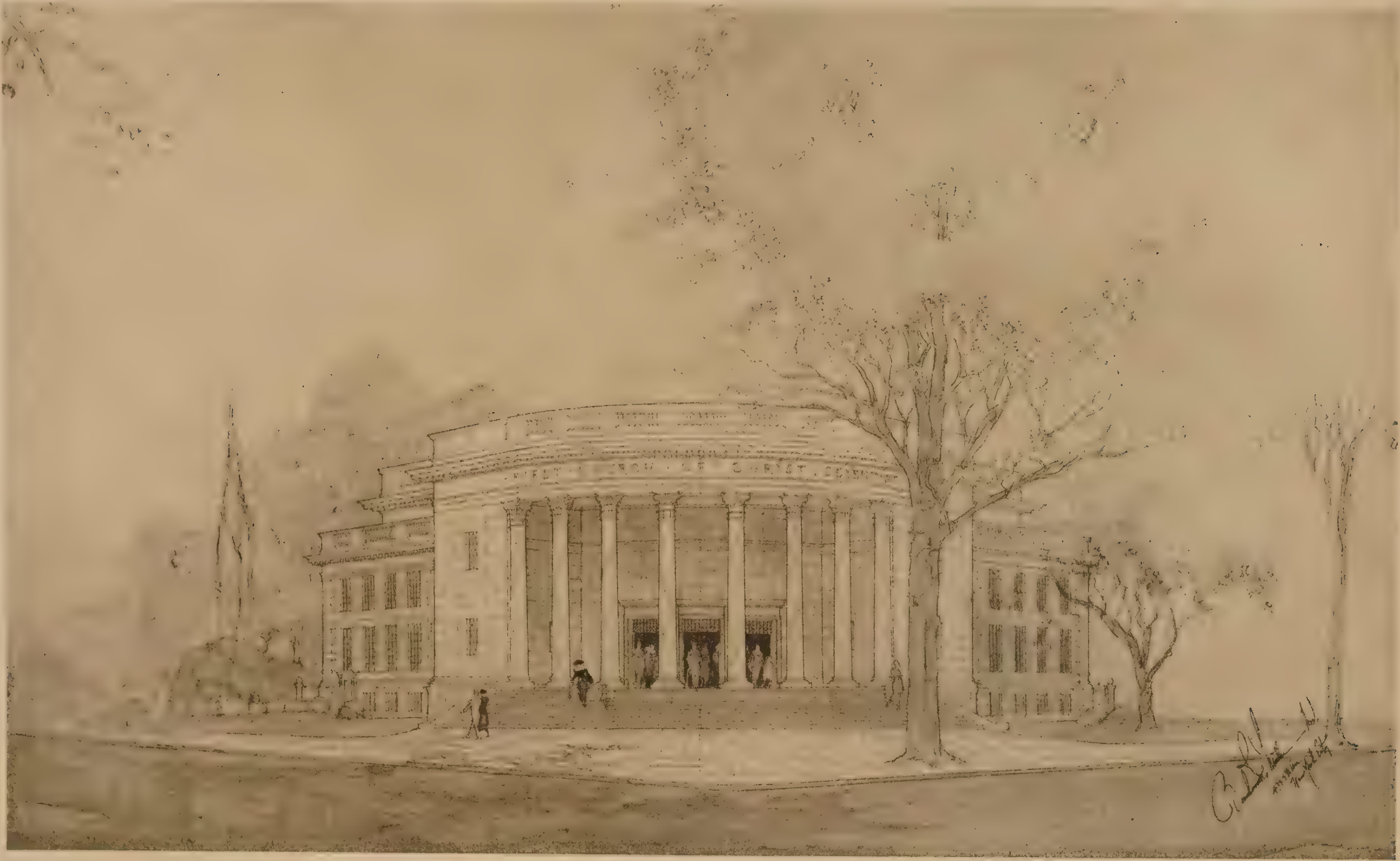


AUDITORIUM OF CHURCH.



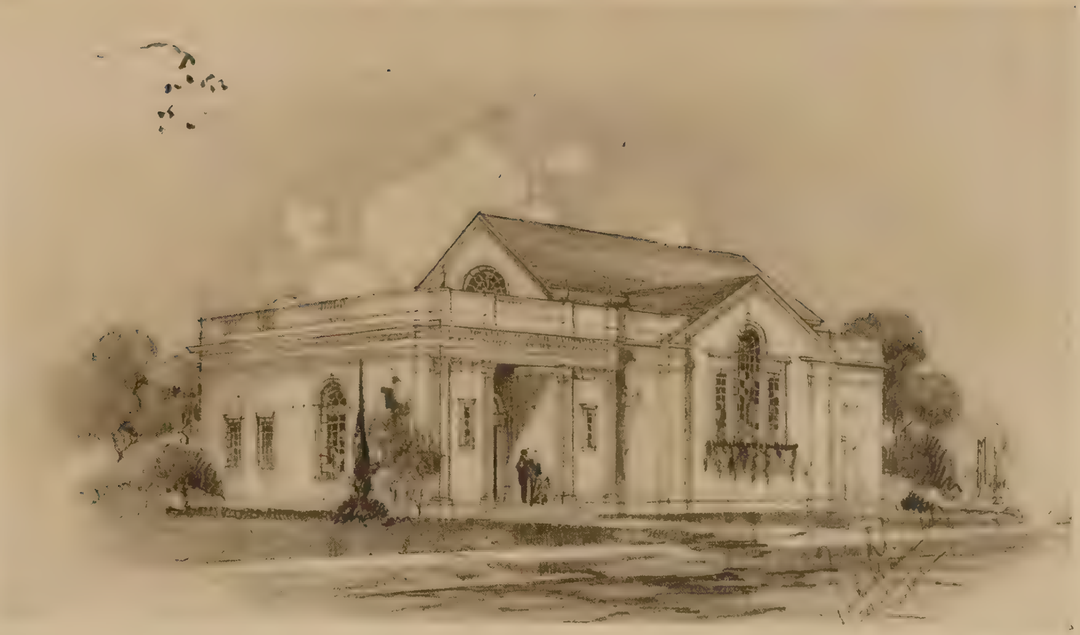
Damon, O'Meara & Hills, Architects.

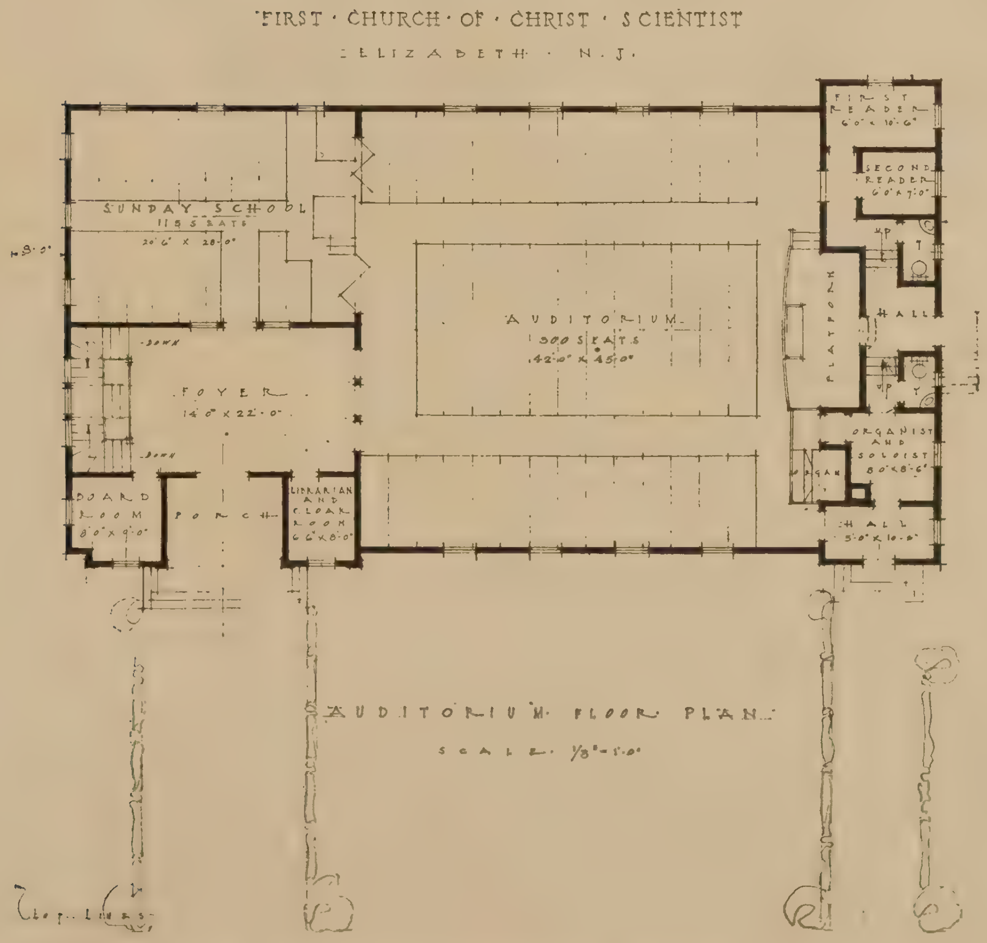
CHURCH AND SCHOOL OF ST. LAWRENCE, R. C., MINNEAPOLIS, MINN.


FIRST CHURCH OF CHRIST SCIENTIST

DESIGN FOR FIRST CHURCH OF CHRIST SCIENTIST, SCHENECTADY, N. Y.

Bernhardt Muller, Architect.





FIRST CHURCH OF CHRIST SCIENTIST, ELIZABETH, N. J.

Bernhardt E. Muller, Architect.

Book Reviews

THE PRACTICAL BOOK OF FURNISHING THE SMA[illegible] AND APARTMENT. By Edward Stratton Holloway, [illegible] of "The Practical Book of Interior Decoration." New volume in the "[illegible] Practical Series." Nine illustrations in color, 106 in [illegible] tone. J. B. Lippincott Co., Philadelphia.

[illegible] is room for and an abundant need for books that will [illegible] be possible, good taste in furnishings. [illegible] better things. It is [illegible] use of all dimensions. [illegible]

[illegible] By [illegible]

[illegible] in the comparatively [illegible] one-nineteenth of the United [illegible] climates of Europe according to the [illegible] forms of architecture must bear the [illegible]

[illegible] studies, each one of which may serve as [illegible] are not suggestions for the reconstruction of the devas[illegible] The author—and the government which is upholding him—[illegible] the monotony of applying the motto of "economy" to [illegible] would mean the toleration of unadorned [illegible] Such a policy would make the recon[illegible] a scar. Mr. Letrosne, a much wiser, [illegible] general economy, practised in [illegible] the world with pride instead of [illegible] he sets the compass in [illegible]

[illegible] not even think of ever [illegible] any of the so-called [illegible] conceptions of the modern French structures. To [illegible] be more than [illegible] at this time.

[illegible] ance as everywhere else, a third or fourth rate town [illegible] more importance by erecting public buildings commen[illegible] rather than the place, and all these buildings would [illegible] stamp not always in harmony [illegible] not the least thing that this [illegible]

[illegible] of unadorned wall spaces, of an utter [illegible] of so-called period styles, that make the designs shown in this [illegible] well worth our serious consideration.

The work is published in France by Dan Niestlé, 5 Rue de Vienne, Paris. [illegible] Street, New York.

THE BEAUTIFUL NECESSITY. Seven Essays on Theosophy and Architecture. Second Edition. By Claude Bragdon, F. A. I. A. Alfred A. Knopf, New York.

Mr. Bragdon says that "the one important influence that has operated to modify my opinion concerning the mathematical bases of the arts of space has been the discoveries of Mr. Jay Hambidge with regard to the practice of the Greeks in these matters as exemplified in their temples and their ceramics, and named by him dynamic symmetry."

[illegible] "the entire field of research into the mathematics of [illegible] such richness that whenever a man plants his metaphysical [illegible] to come upon 'pay dirt.' 'The Beautiful Necessity' rep[illegible] of my own prospecting; dynamic symmetry represents [illegible]"

[illegible] pays a fine compliment to Mr. Hambidge, and well he [illegible]

Here, then, are two minds digging and finding "pay dirt" in their metaphysical and mathematical delvings.

You may follow Mr. Bragdon, and you will have to keep very close to him to avoid getting lost in his theosophic idea, "that everything is the expression of self or whatever name one may choose to give to that [illegible]"

The chapter heads suggest that you may enter inviting portals and find yourself in a maze, led by the "theosophic idea" into passages that will absorb your interest and test your capacity for unfamiliar thinking. The world is indeed so full of a number of things, and Mr. Bragdon and Mr. Hambidge lead us into new fields of thought. Mr. Hambidge has many followers who are applying his theories to every-day work in practical designing.

While the book is a revision of an earlier work the author has not taken from it his "first fine careless [illegible]"

CRAIN'S MARKET DATA BOOK AND DIRECTORY OF CLASS, TRADE AND TECHNICAL PUBLICATIONS. G. D. Crain, Jr., Publisher, Chicago.

This is the second edition of Crain's Market Data Book and Directory of Class, Trade and Technical Publications. The first edition received a cordial welcome, which demonstrated the need of an advertisers' reference book of this character. The second edition is prepared along the same general lines, with some amplification of certain classes of material.

The basic idea of the book remains the presentation of the statistical and marketing data regarding each industry, trade, and profession, for the purpose of enabling the advertiser or merchandiser to obtain a picture of the field as a whole. The marketing information is followed by a complete list of publications covering the classification.

THE MERCHANTS' ASSOCIATION OF NEW YORK. YEAR BOOK.

The activities of the Merchants' Association of New York have grown in membership and usefulness, and their Year Book is a useful reference on the city's trades, industries, and professions.

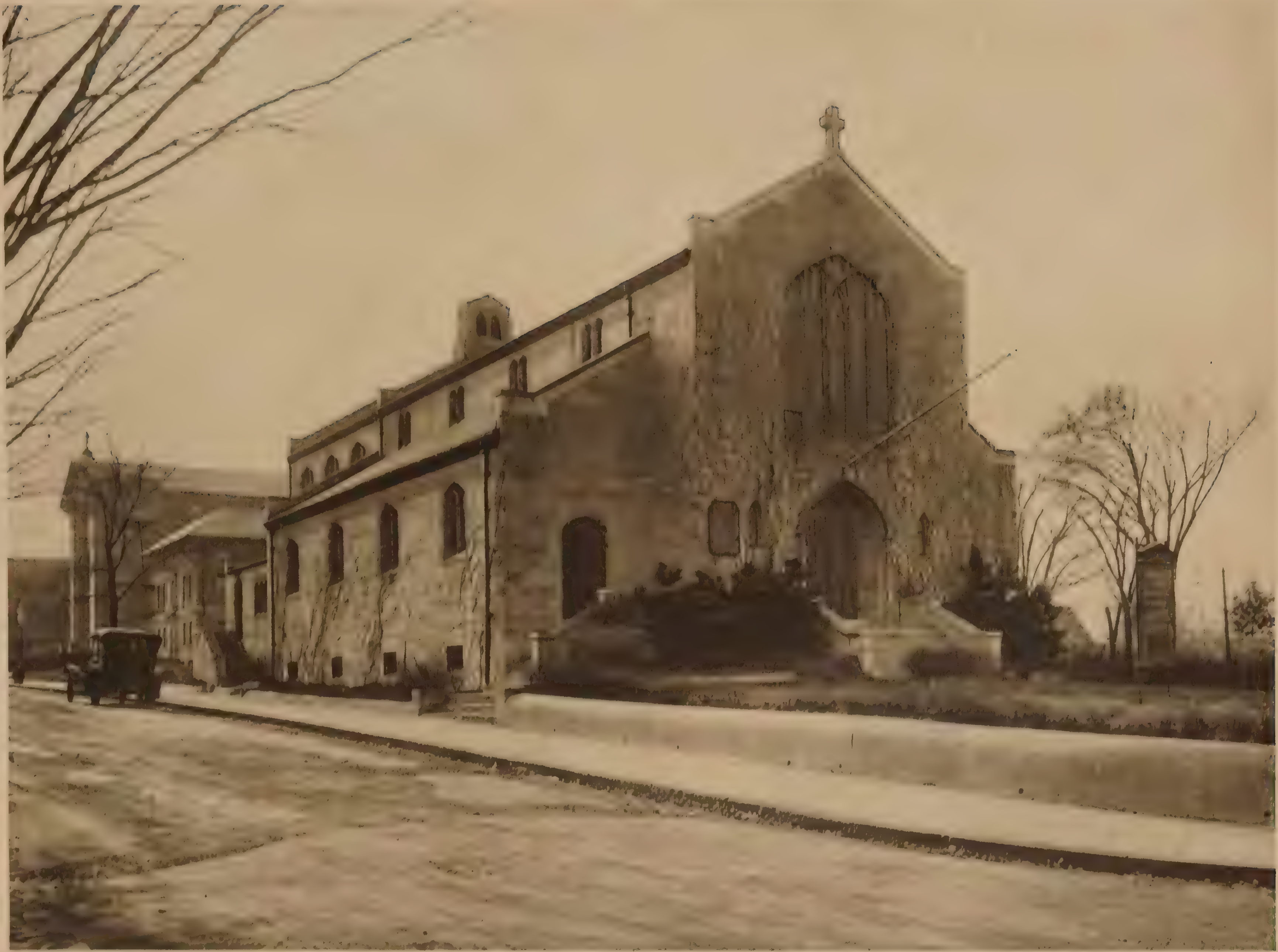
In the Index to Classification, which closes the Year Book, there are 1,133 separate listings showing the comprehensiveness of the enrolment.

As in the early years of the association's existence, the textile industry and banking still constitute the banner divisions in numbers. The membership is large and representative, in the following trades and industries:

Food products and kindred lines; men's apparel and furnishings; transportation and shipping; leather and boots [illegible] products; insurance; heavy [illegible] wear; drugs, chemicals, colors, oils, and paints; iron and steel, metals; engineering, building, building equipment; jewelry stocks; realty.

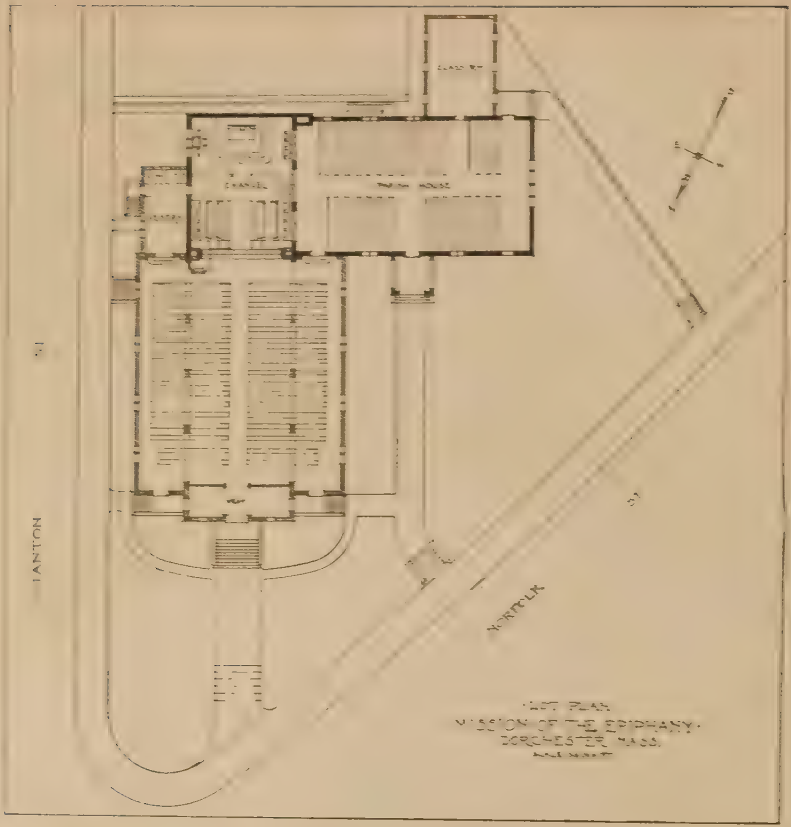
THE AMERICAN ARCHITECT SPECIFICATION MANUAL. A Compilation of Specifications of Advertised Materials and Accessories as Prepared by Representative Manufacturers for Use by Architects and Architectural Engineers. Volume IV, 1922. Issued annually by *The American Architect*. The Architectural and Building Press, Inc., New York.

An invaluable reference for every architect's office.



THE MISSION OF THE EPIPHANY, DORCHESTER, MASS.

Frank A. Bourne, Architect.



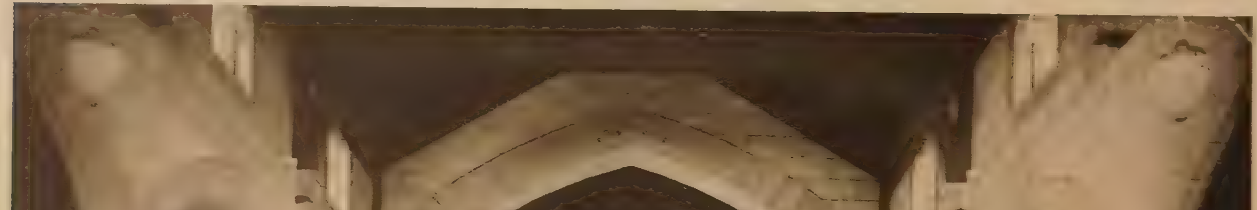
The Mission of the Epiphany

Dorchester, Mass.

Frank A. Bourne, Architect

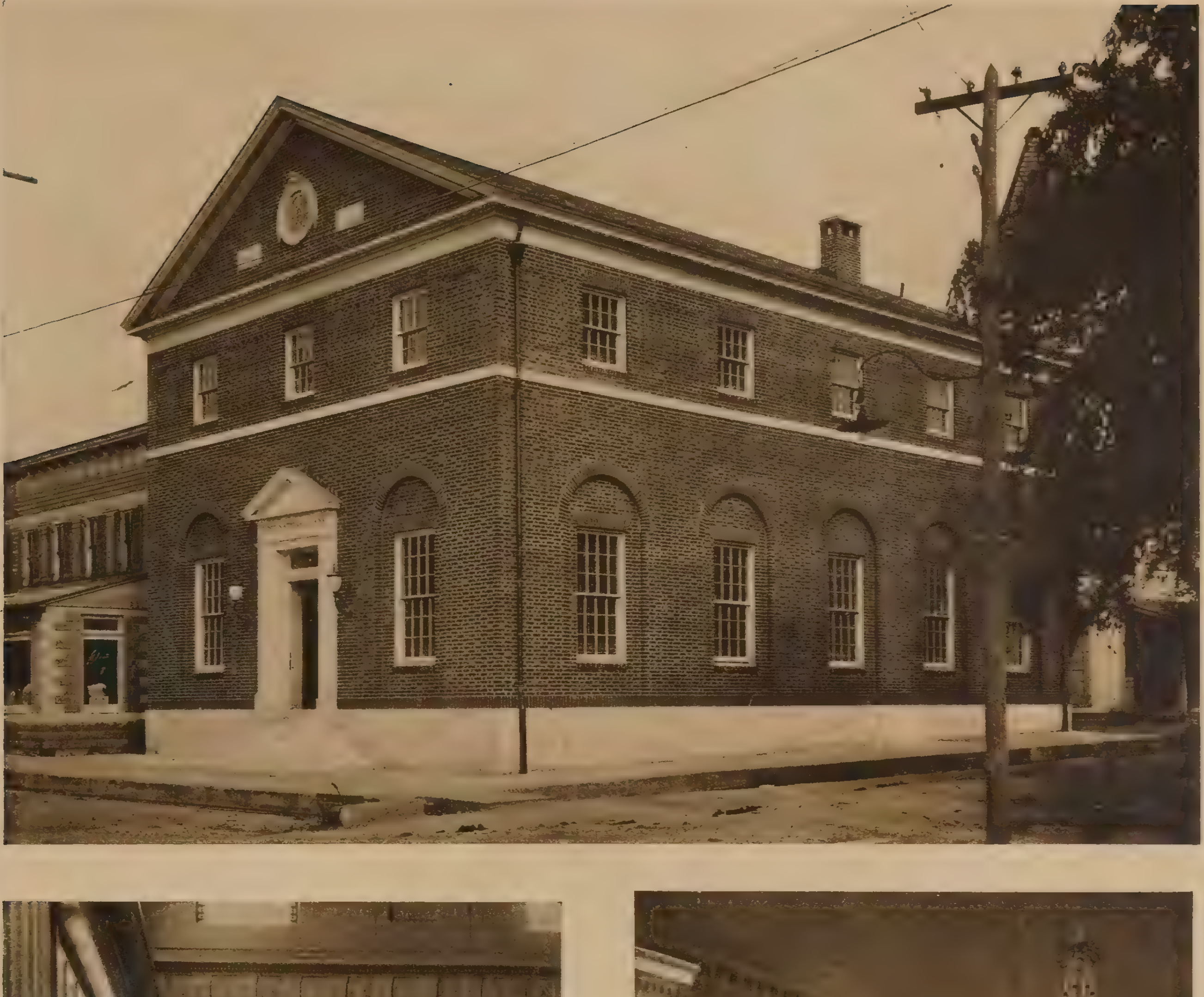
The chancel and parish house were built, and the nave of the church was added six years later.

Architecturally the church is interesting, because it is built entirely of concrete, the walls being of large concrete blocks twelve inches in height, which give a dignified scale to the building. The leaded glass is set in concrete tracery. The only woodwork is the roof, the doors, and the furniture. There is no lath and plaster and no wood floor. For a church it is an excellent example of inexpensive but sincere and permanent construction.

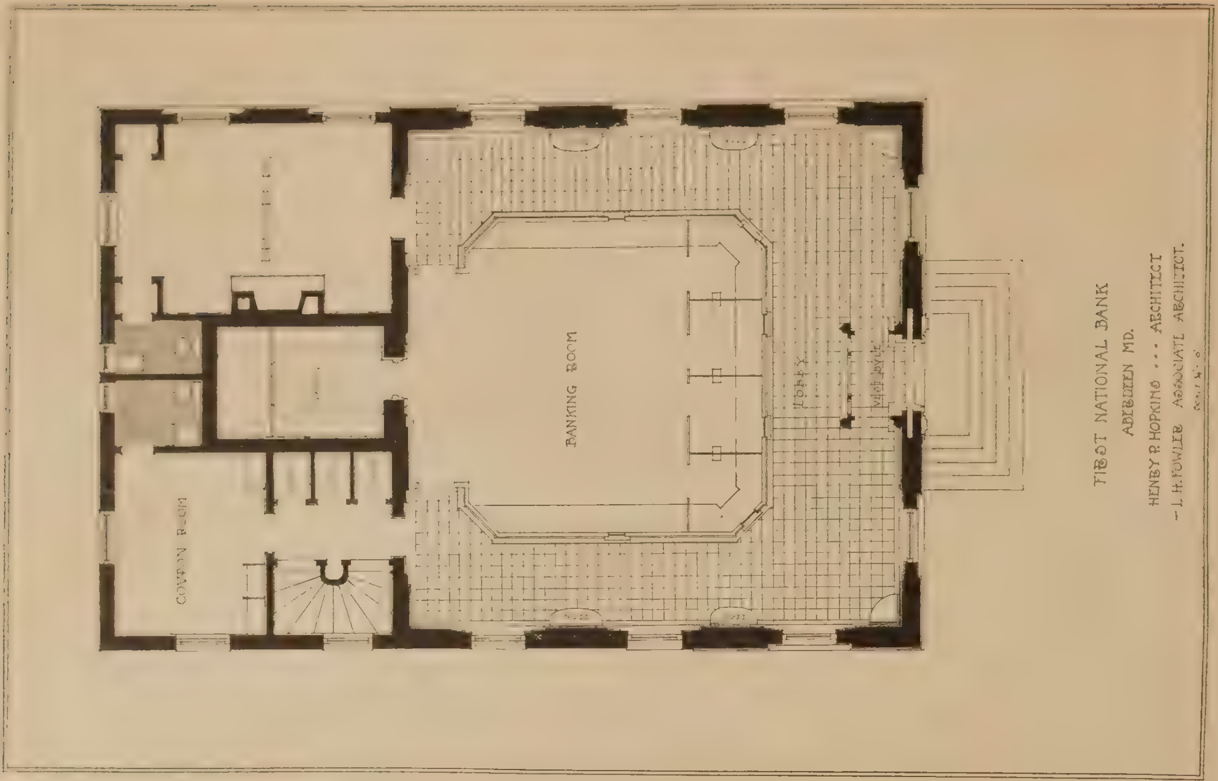


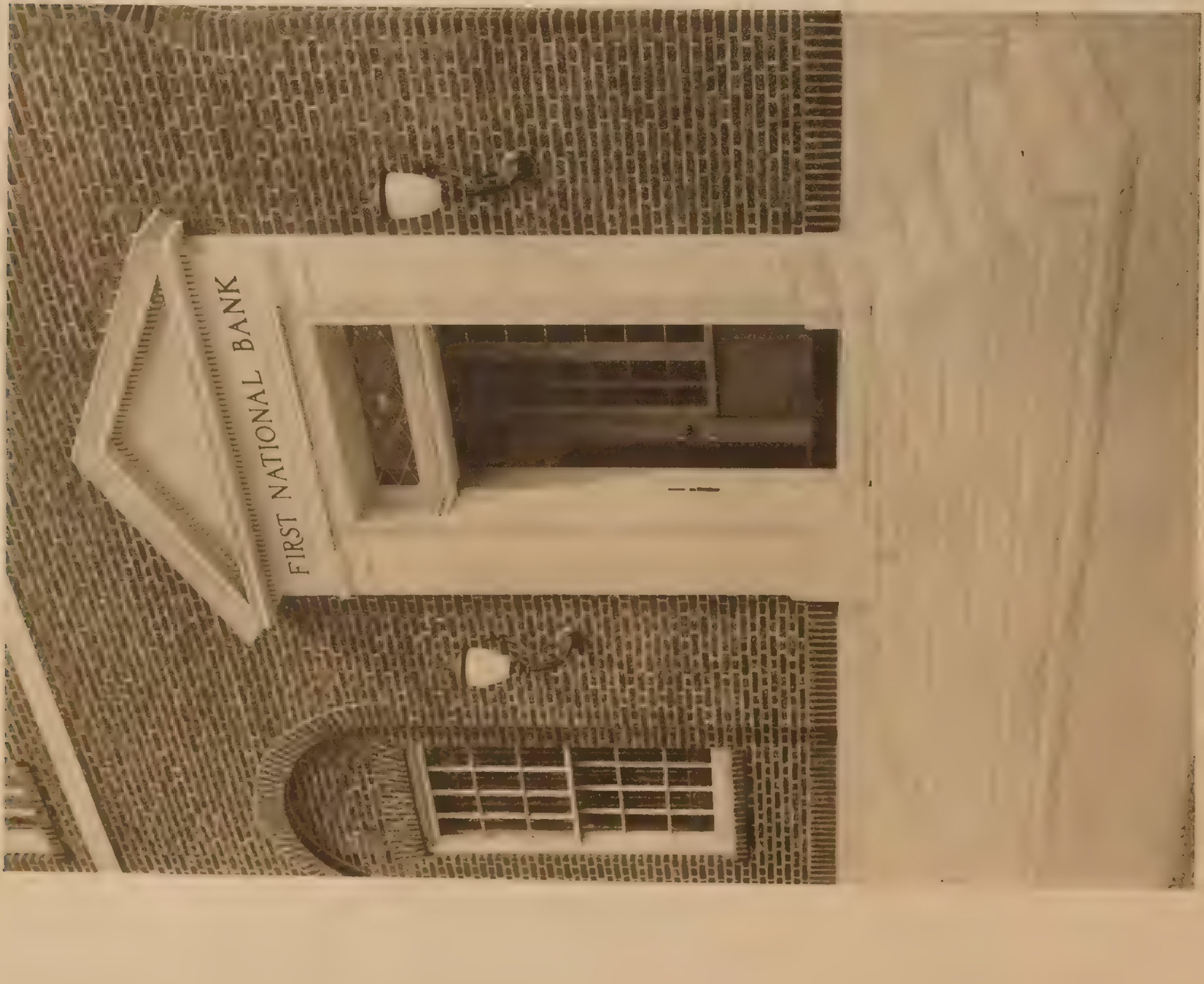
INTERIOR.

MISSION OF THE EPIPHANY, DORCHESTER, MASS.

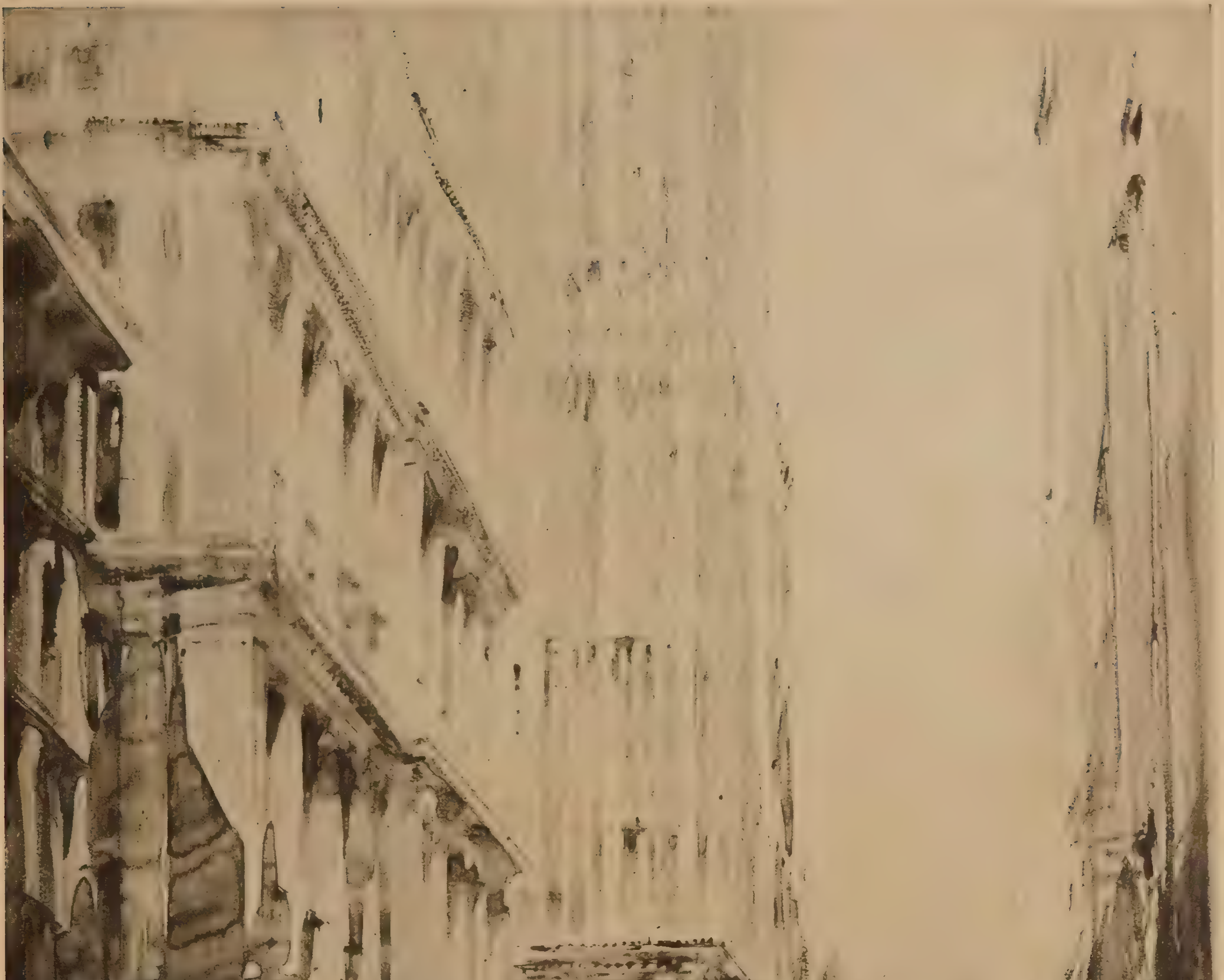


FIRST NATIONAL BANK, ABERDEEN, MD.
Henry P. Hopkins, Architect. L. H. Fowler, Associate Architect.





DETAIL OF ENTRANCE.



LOWER BROADWAY.

From the Water-color by William Walcot. By Courtesy of the Knoedler Gallery. See also page 383.

The Application of Paint and Varnish

By David B. Emerson

IN an earlier article (May, 1922) I gave a general synopsis of what paints and varnishes were, and of what they were composed. In this article, I shall give some general information and advice to young architects and superintendents as to the best methods of specifying and applying them.

In painting and varnishing, good workmanship and the intelligent handling of materials are quite as necessary as are good materials, as a poor job is often done with the best of materials improperly applied; whereas, a fairly good job may sometimes be done with inferior goods if applied well and handled intelligently; but a really good and permanent job can only be obtained by the use of the best materials properly applied.

The first and most important consideration in the applying of paints and varnishes is to be sure that the surface which is to be painted over or varnished is in proper condition, and in the case of interior work, that the building is well dried out, so that the woodwork will not absorb moisture from the walls and floors. It is absolutely impossible to obtain good results when paint or varnish is applied on damp surfaces or in damp, cold buildings. One of the greatest evils in our present system of building is the "hurry-up" method of construction. Trim, wainscot, panelling, etc., are installed in the building before the plaster has had time to dry properly, floors are laid over cinder concrete fill which is only partly set, which in turn has been laid on concrete floor slabs which have very often only been allowed to stand the minimum amount of time before plastering is begun and the floors are laid. Naturally, a building which is rushed through in this manner reeks with moisture, especially in the colder months and during the rainy weather of the spring and fall. If building operations are in any way liable to be carried into the winter months, the specification writer should always call for temporary heat in the building, and the superintendent on the job should see that that particular part of the specification is complied with.

Another of the common evils of rush jobs in buildings is that the painter is allowed to work on the outside of a frame building while the plasterers are working on the inside. This should never be allowed, as the moisture from the plastering is absorbed by the woodwork, rendering the outside surfaces unfit for painting and causing the paint to blister and scale. Too much stress cannot be put on the advisability of painting the back of all trim, wainscot, and other interior woodwork. The expense is negligible and the gain is considerable, for although the plaster behind the trim may be thoroughly dry when the trim is installed, a certain amount of dampness may be absorbed from the atmosphere, and after protracted spells of rainy weather walls some time will get damp, no matter how well they have been built, and the natural result is the unprotected backs of the trim and wainscot absorb that dampness, with the attendant warping and twisting. A good coat of white lead and linseed-oil furnishes excellent protection, but when very expensive hardwood trim is used, it is better and safer to use a regular damp-proof paint made from an asphalt base. As a general rule, very little attention is paid to the priming coat of paint; almost any kind of paint will do, and it can be put on in any way and it is considered "good enough." This is decidedly wrong, as the life and the looks of the succeeding coats are very largely dependent on the material and workmanship in the priming coat.

Different woods need different priming coats. Yellow pine and cypress should be primed with red lead mixed with equal parts of raw linseed-oil and turpentine for exterior work and one-third red lead and two-thirds white lead mixed with equal parts raw linseed-oil and turpentine for interior work. White pine, poplar, and other less resinous woods should be primed with white lead mixed with about two-thirds raw linseed-oil and one-third turpentine. Before priming, all woodwork should be thoroughly cleaned and well sandpapered, all knots and pitchy places should be brushed over with turpentine and then coated with shellac. In applying the priming coat, it should always be brushed on and not flowed on, and should be laid off smoothly, as brush marks left in the priming will sometimes show through the succeeding coats. The priming coat should always be allowed to dry thoroughly before the succeeding coats are applied; the longer the better; two or three weeks is not a bit too long, as linseed-oil dries by oxidation, the outer surface hardening first. Each coat should be thoroughly dry and hard before the next coat is applied.

To obtain the best results the outer coats of paint should be mixed with white lead and linseed-oil, with the addition of from fifteen to twenty per cent of zinc white, *i. e.*, zinc oxide. No woodwork should ever be given less than three coats of paint including the priming coat, and on high-class work four coats are better, and in the long run are, like all good work, an economy.

A frequent source of worry to the architect is the painting of galvanized-iron work, for if it is not done properly, the paint is very liable to peel off and leave large patches of unprotected metal. Before painting, the surface of the galvanized iron must be thoroughly cleaned. This may be done by washing with benzine and then coating the surface with a solution of copper acetate in water, using six ounces to the gallon of water, or by washing the surface with vinegar. After cleaning, prime with red lead mixed with one-third boiled linseed-oil and two-thirds raw linseed oil, and then paint with white lead and linseed-oil, the same as specified for woodwork. As a priming coat for ironwork, there is probably no better paint to resist corrosion than red lead, but it should always be given an outer coating of white lead and oil, which in turn protects the red lead.

With woodwork which is to be stained before varnishing or waxing, different woods must be treated differently. Acid stains are the best for mahogany, birch, and almost all other woods, whereas only an oil stain should be used for yellow pine, as acid or water stains raise the grain too much in this particular wood. Before staining yellow pine the wood should be given a very thin coat of linseed-oil and turpentine mixed in the proportion of one part oil to three parts turpentine. In all cases where woodwork is to be stained and varnished, it is absolutely essential that the surface of the wood should be properly prepared before applying the stain or filler. It should be thoroughly cleaned and all plaster spots, etc., removed, then sandpapered thoroughly, using a fine sandpaper, rubbing with the grain of the wood.

(*Continued on page* 384)

Antony in Egypt. The morning of the festival. *From the etching by William Walcot.*

William Walcot, Architect, Painter, Etcher

WILLIAM WALCOT, the English architect, painter, and etcher, who has been in America for some time making studies of our architecture, comes of an old English family, which for the last two generations lived abroad. He was born in Russia in 1874, and was educated in Paris. He studied architecture at the Imperial Academy of Arts, Petersburg, and also at Paris, and practised as an architect for several years before he devoted himself to the graphic interpretation of architecture.

He is a Fellow of the Royal Institute of British Architects, and is also a Fellow of the Royal Society of Painter-Etchers.

His first exhibition, held in London in 1908, brought him immediate recognition from art lovers.

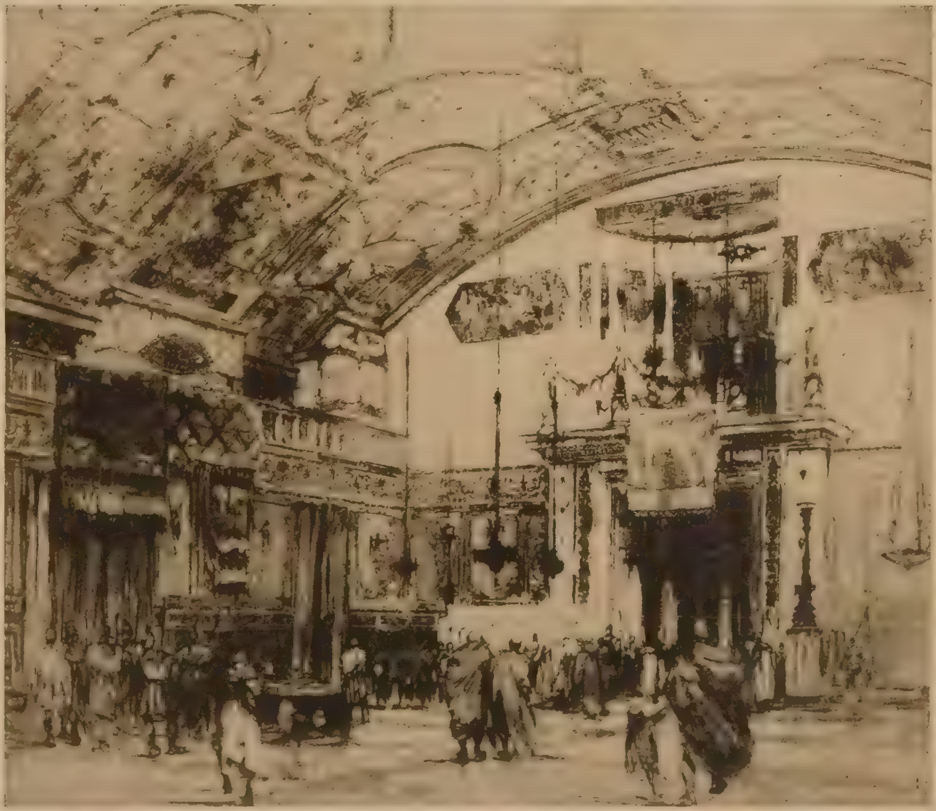
As a re-creator of the spirit of the great past he stands alone. With brush and etching-needle he depicts the glories of ancient architecture, and by his magic Greece and Rome live again as once they were.

Mr. Walcot, with the trained architect's understanding of structure, brings to his work an interpretative sense imbued with imagination and poetry. He gives the spirit and character of the scenes he depicts with essential truth and with the true artist's appreciation of the value of suggestion—knows when to omit unnecessary details.

He has made many friends while here, and the exhibition of his water-colors and etchings at the Knoedler Gallery was seen and admired by many members of the architectural profession.

We shall all be much interested in seeing more of Mr. Walcot's distinguished drawings and etchings.

His comments on our buildings, especially of course upon the unfailing and insistent topic of discussion, our skyscrapers, have been those of a man whose judgment is based on special knowledge and wide observation. He thinks we have met new conditions and solved a very difficult problem with great skill and with an especially happy use in the application of classic elements to commercial structures.



The atrium *From the etching by William Walcot*

(*Continued from page* 382)

Work should be thoroughly and well dusted before applying the stain, taking especial care to dust out all mouldings, corners, and angles. Before applying acid stains, the woodwork should be well sponged with water, then sandpapered before staining. The reason for this is that acid stains have a certain tendency to raise the grain of wood, and sandpapering after staining will cause streaking, whereas the sponging with water will raise the grain of the wood if there is any tendency that way, and after sandpapering stains may be applied to the surface and the grain will not raise.

Some authorities recommend two coats of acid stain for high-class work, the first coat to be applied full strength, and the second coat to be diluted with one-half water, sandpapering the first coat. This also gives excellent results. Always after staining woodwork, it should be given a thin coat of pure alcohol shellac. This prevents the bleeding of the stain through the varnish.

In the finishing of open-grained woods like oak, ash, chestnut, walnut, butternut, teak, or elm, which have been stained with an oil stain and are to be filled, always shellac before filling, as the shellac will prevent the stain rubbing off when the surplus filler is wiped off. This will not be necessary when acid or water stains are used, in which case the wood may be stained, filled, and then shellacked. A most important factor in the varnishing of woodwork is the selection of the right varnish or the right place.

For exterior work which is to be exposed to the weather, an exterior varnish or a spar varnish should always be specified. Interior woodwork, if it is to be finished with a dull gloss, should be specified to be varnished with a rubbing varnish, if a high-class job is desired, but if the initial cost has to be considered, specify a dull varnish, of which there are quite a number of good makes on the market. In the finishing of church pews, assembly-room and school seats, a special hard-drying varnish which will dry without tack should be specified. If floors are to be varnished, a floor varnish should always be specified. To obtain the best results with the use of any varnish, one coat should not be applied until the preceding coat has had ample and sufficient time to dry, and each coat should be well sandpapered with OO sandpaper before the succeeding coat is applied.

One point which should always be remembered in specifying the finishing of exterior woodwork is never to specify acid stains; always specify a pigment oil stain, as acid stains must always be given a coat of shelkac to prevent bleeding through, and shellac will not withstand the effects of the elements. In finishing open-grained woods, a colored filler may be used, and no stain will be required.

Of late years wax finishes on hard wood have become quite popular, and a number of the leading varnish houses are selling prepared finishing wax. Finishing by this method is in all ways similar to varnish finishing. The wood should be stained, filled, and shellacked, and then given one or two coats of wax, omitting the filler in close-grained woods. In finishing hardwood floors properly, too great care cannot be exercised if the best results are desired. In the beginning, care should be taken to see that only well-seasoned, thoroughly kiln-dried flooring is used. It should not be laid until the building is thoroughly dried out and all of the standing trim is set and ready for painting, and all other work completed, so that the mechanics will not be obliged to walk on the finished floors and carry materials over them. After the floors are laid, they should be thoroughly scraped and sandpapered, swept clean and wiped with a soft cloth till all dust is removed. They should be thoroughly protected until the rest of the painting is completed. The last work to be done should be the finishing of the floors, which should always be commenced on the top floor of the building, working out toward the stairs and down through the building, finishing at the front entrance, so that there will be no cause for travelling over the freshly finished floors. Floors may be varnished or waxed, as may be desired.

If oak or any other open-grained wood is to be varnished, it should first be stained with an oil stain, sandpapering the stain, then filled with a paste filler. After allowing the filler to set, it should be wiped off with burlap, rubbing across the grain. After the filler has thoroughly hardened, give two coats of floor varnish, sandpapering the undercoat. If a dull finish is desired, the second coat may be rubbed with pumice-stone and water. Close-grained woods, such as maple or birch, should be treated the same way, except that the filler should be omitted. When varnishing floors, never use shellac or liquid fillers as first coaters. If floors are to be waxed, they may be stained and filled in the same manner as decribed for varnished floors, and then given two coats of prepared floor-wax, each coat to be rubbed with a weighted floor-brush and polished with a soft cloth. A number of more elaborate formulas are circulated by the manufacturers of hardwood flooring, but the final results are very little if any better than those which are recommended by the varnish manufacturers, which have been quoted.

There is no doubt that one of the best adjuncts to the office of an architect whose work is not strictly commercial, and where the only idea is not to finish up every job as quickly as possible at the very lowest possible cost, but to make each piece of work something worth while, is a competent, capable, and conscientious painting contractor. Such a man can take his inspiration from the architect, experiment with finishes, produce new effects and reproduce old ones; but alas, in these days of rush and hurry, they, like all good craftsmen, are becoming rarer and rarer each year!

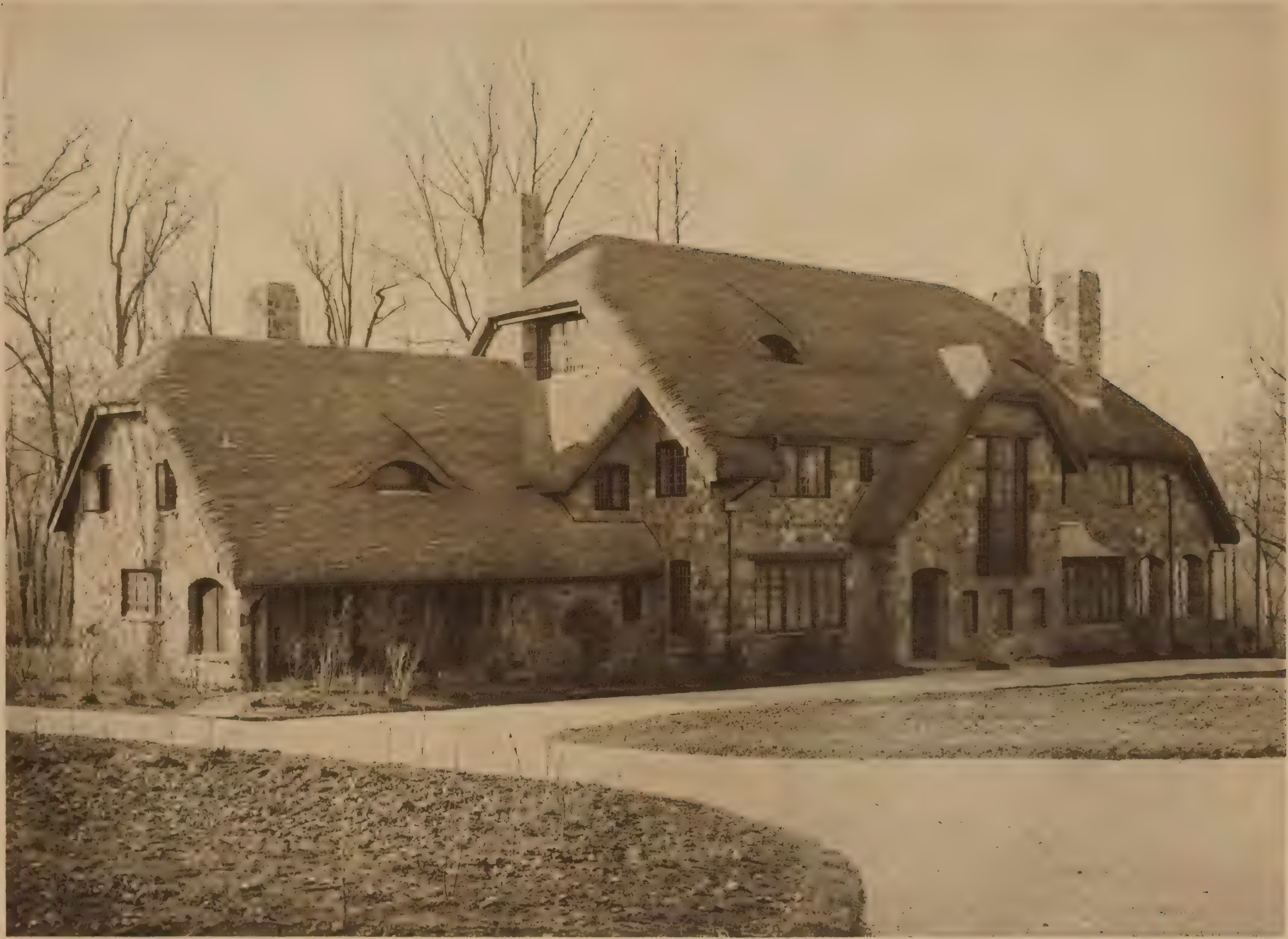
(*Continued from page* 372)

Sedille remarks that color which had taken refuge in the interiors of the structures in the time of Louis XIV under the form of decorative painting soon deserted the salons of Louis XV. Thenceforth all was given up to white, save only a few ceilings and door-heads, which lingered on in the scale of soft and insipid tints. Color was absolutely absent during the eighteenth century.

What was true of the latter Renaissance in Italy and France was also true of England, and consequently of our own work, the early inspiration of which came from England. Thus, it will be seen that a white or gray monochromatic architecture is not only unnatural but also exceptional in the history of architecture. The reaction against this tendency has already set in in America. What shall we do to solve skilfully the problem of more color in architecture?

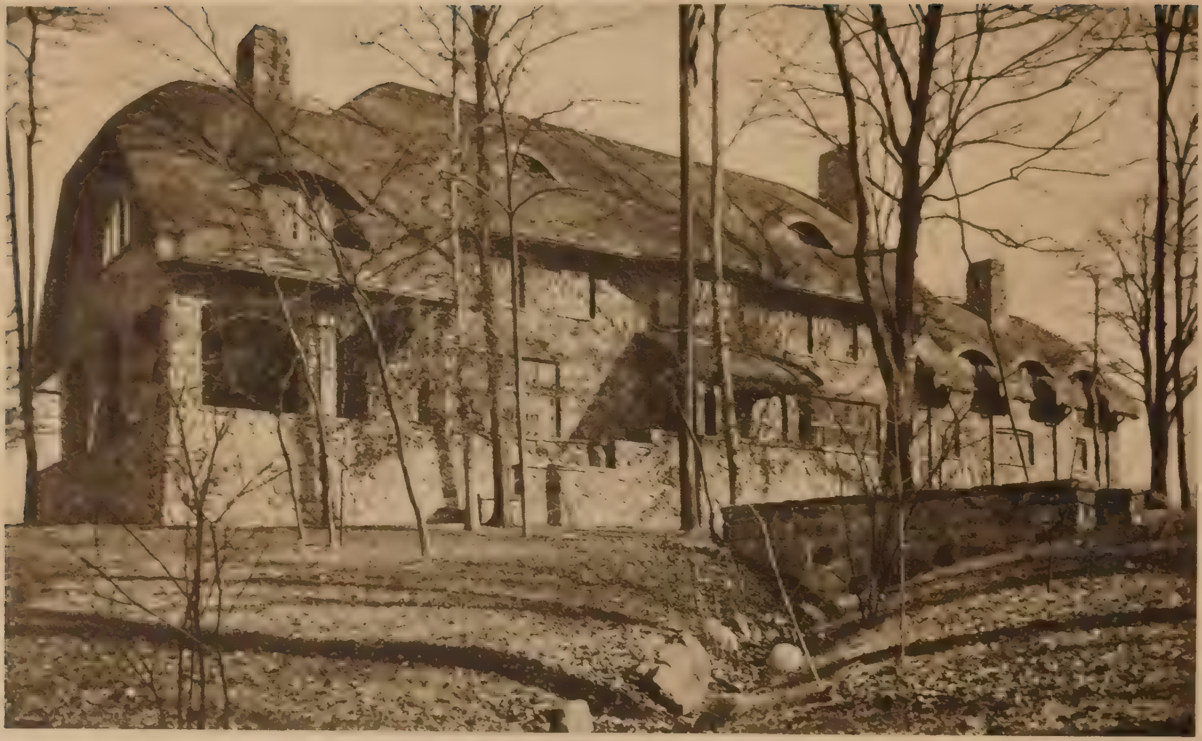
After this lengthy discussion you will probably won-

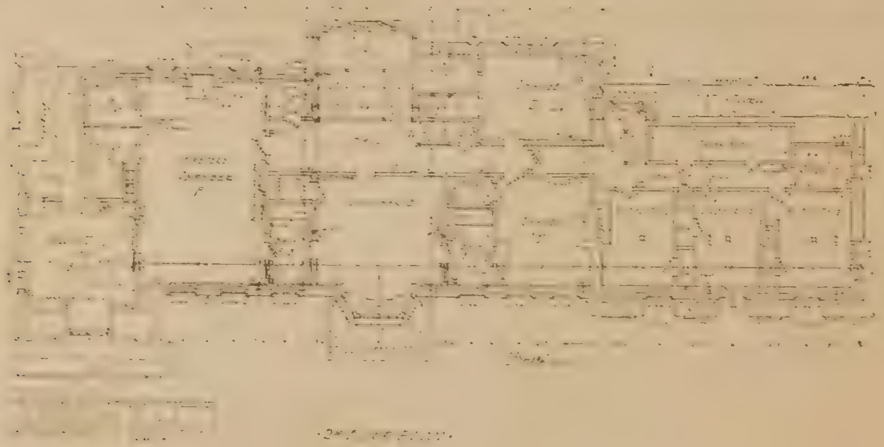
(*Continued on page* 392)

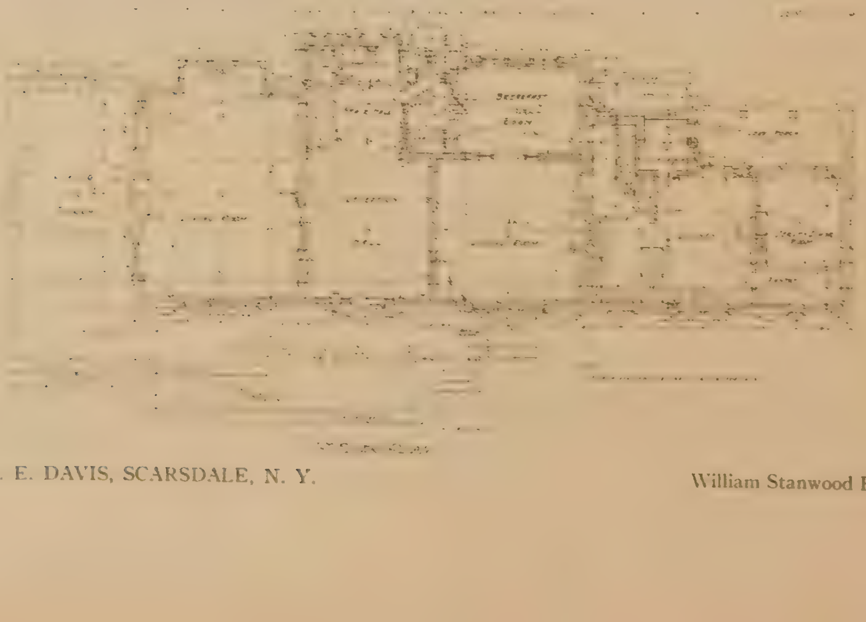


RESIDENCE, A. E. DAVIS, SCARSDALE, N. Y.

William Stanwood Phillips, Architect.







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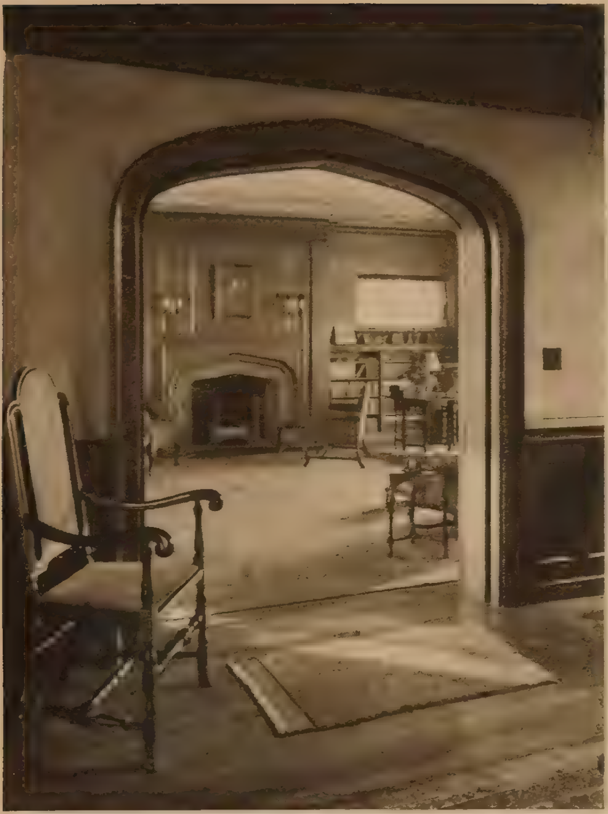
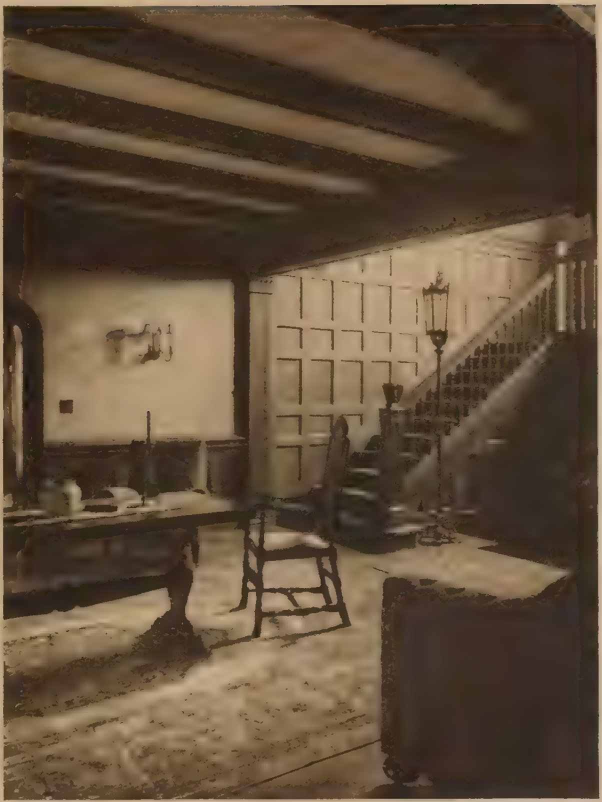
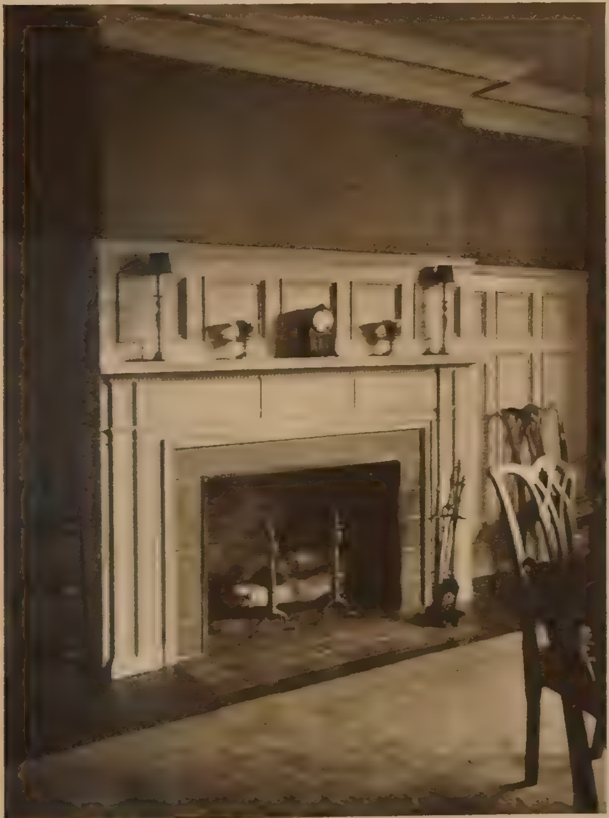
William Stanwood Phillips, Architect.



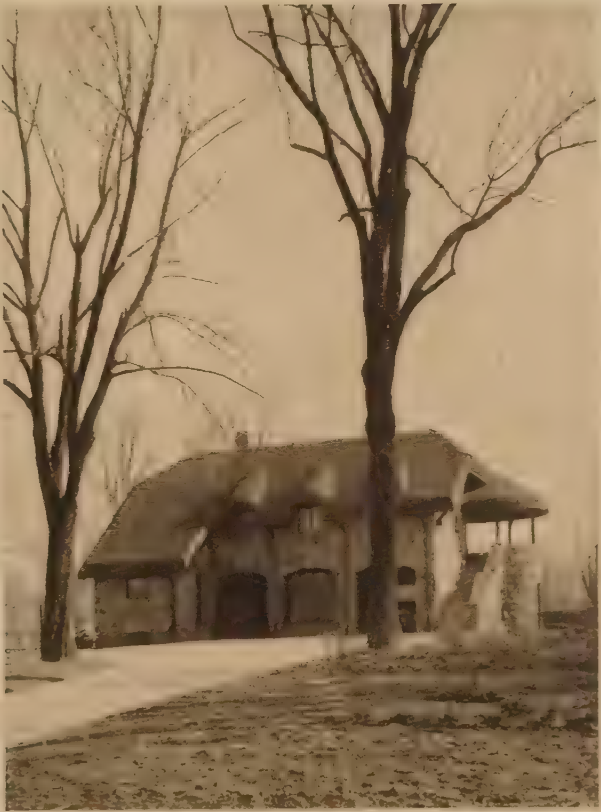
HALL, TOWARD LIVING-ROOM.



HALL AND STAIRWAY.



DINING-ROOM.



GARAGE. William Stanwood Phillips, Architect.

RESIDENCE, A. E. DAVIS, SCARSDALE, N. Y.

Drafting-Room Mathematics

By DeWitt Clinton Pond, M.A.

SECOND ARTICLE

ALMOST every one is familiar with the geometric proposition that the sum of the squares of two legs of a right triangle equals the square of the hypothenuse. It is a proposition not easy to prove by geometrical means and many schoolboys have puzzled over it without developing a great fondness for the men of classic times who originated that branch of mathematics.

It is not my intention to develop the proof of this proposition, but if the reader is interested in refreshing his memory he may do so by investigating Fig. 8 and demonstrating that the two triangles *A C D* and *A B J* are equal and have areas equal to one-half the area of the square *A H* and the rectangle *A K*. From this it can be seen that the square *A H* equals the rectangle *A K*. In the same manner the rectangle *K B* will be found to equal the square *B G*, and so the square *A E* must equal the sum of the two squares *A H* and *B G*.

This can be checked by means of trigonometry. There is a very useful right triangle which has sides measuring 3, 4, and 5 respectively (Fig. 9). If it is necessary to lay out a right angle, either in the field or in the drafting-room, without the customary instruments, this can be done by laying out a triangle having sides with relations similar to those in the figure. As the square of 3 is 9 and that of 4 is 16, the sum of the two squares must equal 25, which is the square of 5. Therefore, according to the geometrical proposition given above, the angle *C* must equal 90 degrees.

In order to determine the angle *A*, it is only necessary to divide *C B* or *a* by *C A* or *b*, so that the tangent of the angle will be given $3 \div 4 = .75$. By looking through a table of natural tangents of angles, it will be found that this is the tangent of 36 degrees, 52 minutes. The natural sine of this angle is .6000. In order to check that the side *B C* or *a* equals 3, it will only be necessary to multiply the sine by *A B* or *c*, which equals 5, $.6000 \times 5 = 3$. In like manner *b* can be formed to equal 4 by multiplying the cosine of 36 degrees, 52 minutes, by 5. The cosine is .8000.

$$.8000 \times 5 = 4$$

If *C* were not a right angle these figures would not check.

In all previous problems the *natural* functions of the angles have been used, but actually architectural engineers seldom use these functions. They use instead what are known as logarithmic functions.

It is rather difficult to describe just what logarithms are without giving examples. It is generally well known that the following algebraic expression is correct:

$$x^2 \times x^2 = x^4$$

Stating this in ordinary arithmetic, the expression can be written

$$2^2 \times 2^2 = 2^4$$

This may be stated in the very simplest way as

$$4 \times 4 = 16$$

In this manner it is seen that it is only necessary to add the exponents to determine the proper exponent in the result:

$$10^2 \times 10^3 \times 10^4 = 10^9$$
$$100 \times 1{,}000 \times 10{,}000 = 1{,}000{,}000{,}000$$

Now, logarithms are simply exponents showing the power to which a certain *base* is raised to equal a certain number. In the above example the logarithms are 2, 3, 4, and 9, and the *base* is 10. In ordinary logarithms, such as are used in architectural drafting-rooms, the base is always 10. Keeping the base constant as 10, it is possible to find an exponent or logarithm for any number whatsoever. It has been found that if 10 is raised to a power of 1.39794, it will equal 25, and if it is raised to the power of 2.39794, it will equal 250. This may be expressed as follows:

$$10^{1.39794} = 25$$
$$10^{2.39794} = 250$$

If it is desired to multiply 25 by 250, the calculations can be carried out in the following manner:

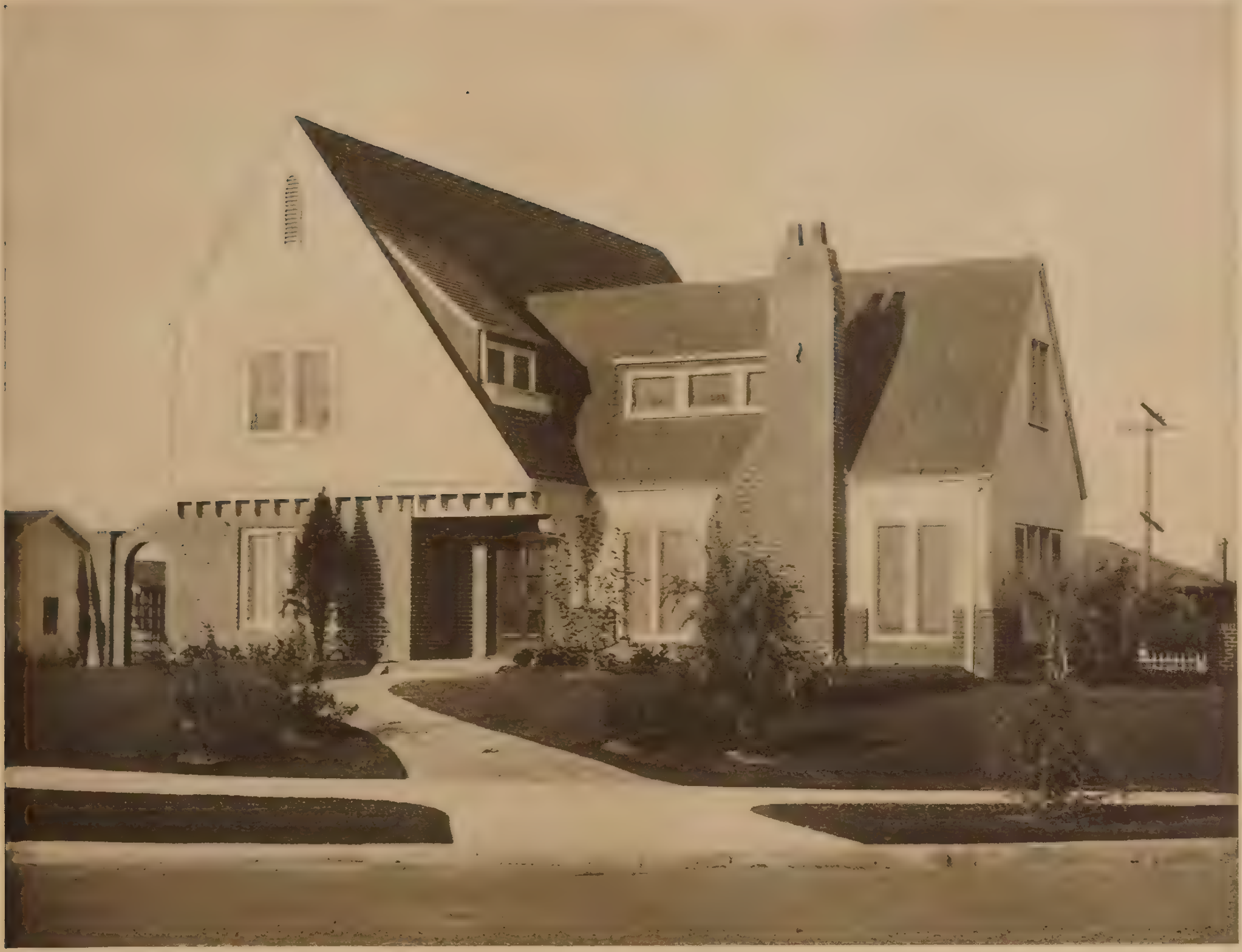
$$10^{1.39794} \times 10^{2.39794} = 10^{(1.39794 + 2.39794)} = 10^{3.79588}$$

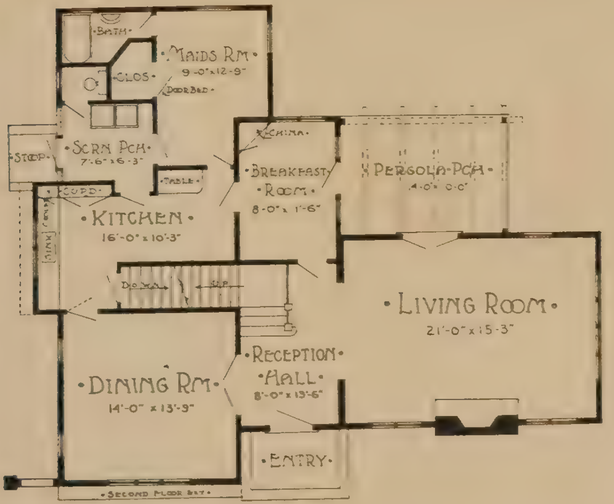
In order to find what the last expression equals, it is necessary to look up the logarithm in a table and find a corresponding number. In looking through the table the digits at the right of the decimal point are the ones which it is necessary to find. In the above case .79588 are the required digits. The corresponding number is found to be 6,250. It will be shown later that, as the characteristic—the digit in the logarithm at the *left* of the decimal point—is 3, the decimal point in the number is placed after the fourth digit from the left, or in this case directly after the zero. The answer is 6,250, and this can be checked by mathematics.

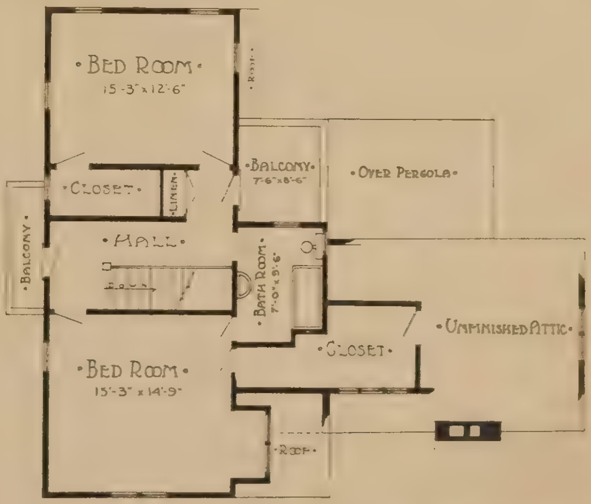
In order for the reader to follow this discussion further, it will be necessary for him to obtain a set of tables of logarithms, trigonometric functions and logarithmic functions. A very useful set of tables is "Smoley's Parallel Tables of Logarithms and Squares." There are other sets of tables which are similar to these, and some such set should be secured if it is desired to follow the methods outlined in this article.

In the previous examples it will be seen that the logarithm of 25 is 1.39794 and the logarithm of 250 is 2.139794. The only difference between the two is the number at the *left* of the decimal point. In the first place this number is 1, in the second place it is 2. These numbers are known as *characteristics*, and for any number between 1 and 100 the characteristic is 1, for any number between 100 and 1,000 the characteristic is 2, and for any number between 1,000 and 10,000 the characteristic is 3. It will be seen that the figures at the *right* of the decimal point remain the same for 25 or 250. In looking up the logarithms of ordinary numbers it will be necessary to turn to the "Table of Common

(*Continued on page* 390)







HOUSE, LOS ANGELES, CALIF.

Jack Olerich, Architect.

The outside walls of the house are of cement-stucco over metal lath and frame construction, finished in light gray. The walls on the front are, in part, surfaced with brick, all brick entering into the walls, the chimney, and the paving being bright red in color, laid in gray mortar. The wood trimming of the exterior is in darker gray than the wall stucco, and the roof covering consists of wood shingles painted dark green.

The interior finish consists of Philippine mahogany in the reception-hall, living-room, and dining-room, of pine in old ivory in the breakfast-room, maid's room, and bedrooms, and of pine in white enamel in the kitchen and two bathrooms. The walls of the kitchen and bathrooms are finished with a smooth, hard plaster surface and enamelled like the woodwork.

(*Continued from page* 388)

Logarithms" such as is found in the last part of Smoley's tables. To find the logarithm of 250, it is simply necessary to look along the column denoted at the top as N until the number is found. The logarithm is found to be .39794. It is necessary to place the proper characteristic at the left of the decimal point. In this case it is 2, and the complete logarithm is 2.39794, as given above. If the number would be 2,500, the logarithm would be 3.39794.

If the number is 2,501, then the logarithm becomes 2.39811. If it is required to find the logarithm of 3,895, look down the column N until 389 is found. Then look to the right until 5 is given at the top of the page. The number in the table will be .59051, and as the characteristic is 3, the logarithm is 3.59051. Expressed differently the expression may be written:

$$10^{3.59051} = 3{,}895$$

If the number for which the logarithm is to be found were 38.95, then the characteristic would change from 3 to 1, as 38 is less than 100. The logarithm of 38.95 is 1.39051.

The characteristic is always *one less* than the number of digits at the left of the decimal point. The logarithm of 128.5 is 2.10890.

It is possible by the methods given above to determine the logarithms of such numbers as 18.55 or 18.56, but it is often required to find the logarithms for such a number as 18.554, and this can be done by proportion. The logarithm of 18.55 is 1.26834 and that of 18.56 is 1.26858; the difference is 24. At the right in a wide column are proportional parts or the various differences between numbers. The difference of 24 is given and four-tenths of 24 is given as 9.6, and by adding this to 1.26834 the logarithm of 18.554 is found to be 1.268436.

These methods may seem to be somewhat complicated and not particularly useful, but by practice the method of finding logarithms is found to be not very difficult and their use results in a great saving of time.

Take a problem where it is necessary to find the elevations of a sidewalk at various places along the front of a building. Suppose the lot measures 87 feet 4 inches along a certain street and that the elevation at one end is 2 feet 8 inches higher than at the other end. At distances of 15 feet 6 inches, 30 feet 10 inches, and 50 feet 8 inches from the low point it is required to find the elevation. This can be done by simple arithmetic, but it may also be solved by the use of logarithms.

Stated as simple arithmetic terms the problem becomes:

$$\frac{2.5}{87.333} \times 15.5 = X$$

$$\frac{2.5}{87.333} \times 30.833 = X$$

$$\frac{2.5}{87.333} \times 50.666 = X$$

A diagram of this problem is shown in Fig. 10.

The logarithms which will be used will be those given for feet and inches found in the first part of Smoley's tables. The first step is to determine the logarithms for the various distances.

The logarithm for 2 feet 6 inches is 0.39794, that of 87 feet 4 inches is 1.94118, and those for 15 feet 6 inches, 30 feet 10 inches, and 50 feet 8 inches are 1.19033, 1.48902, and 1.70472 respectively.

In division it is necessary to subtract logarithms; in multiplication it is necessary to add them. The calculations are shown as follows:

$$\begin{array}{ll}
\text{Log } 2 \text{ feet } 6 \text{ inches} & = 0.39794 \\
-\ \text{Log } 87 \text{ feet } 4 \text{ inches} & = 1.94118 \\
\hline
 & \ 8.45676 - 10 \\
+\ \text{Log } 15 \text{ feet } 6 \text{ inches} & = 1.19033 \\
\hline
 & \ 9.64709 - 10 = \text{Log } 5\tfrac{5}{16} \text{ inches}
\end{array}$$

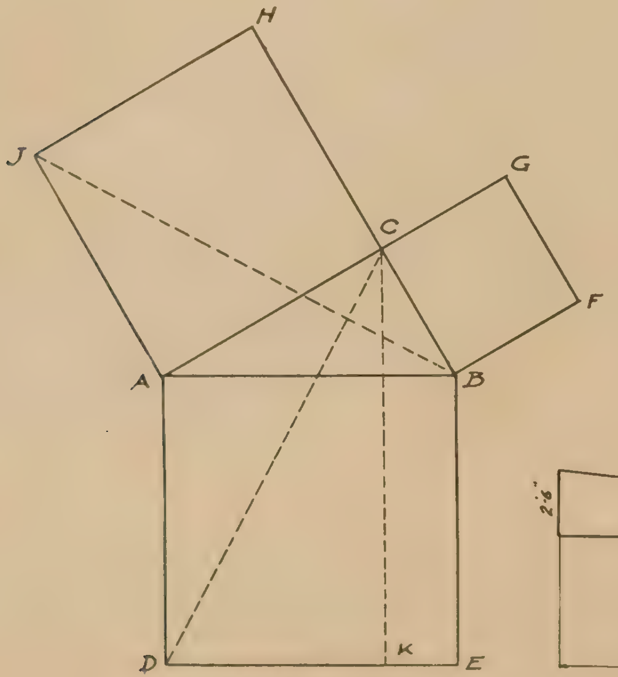


FIGURE 8

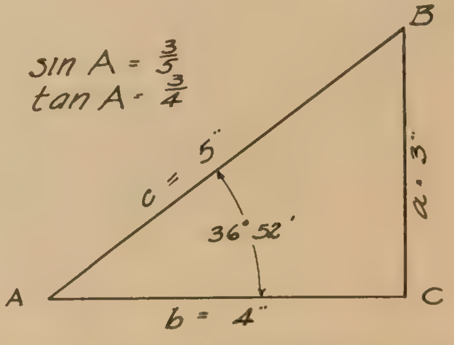


FIGURE 9

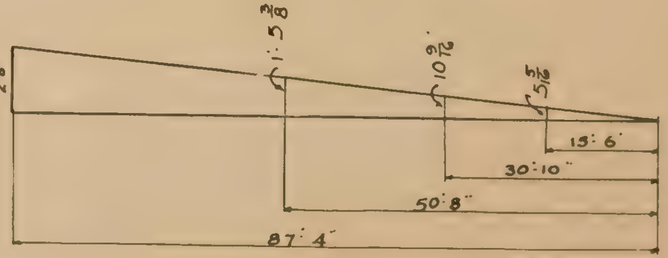


FIGURE 10

$$\begin{array}{rl} & 8.45676 - 10 \\ + \text{Log } 30 \text{ feet } 10 \text{ inches} = & \underline{1.48902} \\ & 9.94578 - 10 = \text{Log } 10\tfrac{9}{16} \text{ inches} \end{array}$$

$$\begin{array}{rl} & 8.45676 - 10 \\ + \text{Log } 50 \text{ feet } 8 \text{ inches} = & \underline{1.70472} \\ & 0.16148 = \text{Log } 1 \text{ foot } 5\tfrac{3}{8} \text{ inches} \end{array}$$

If these calculations are understood it will be seen it is a much more simple proposition to add or subtract the various logarithms than to divide by such figures as 87.333 or multiply by 30.833 and then determine the corresponding equivalent in feet and inches for the answer.

It will be noticed that in the foregoing examples it was necessary to subtract from zero. In such cases zero is regarded as 10 and a figure of minus ten is placed after the logarithm. Such a logarithm as 8.45,676 − 10 would have a characteristic at the left of the decimal point of minus two. The figure which corresponds to this logarithm is .028626. From this it can be seen that the characteristic of minus two means that there should be *one* zero at the right of the decimal point. Had the characteristic been minus three, there would have been two zeros, and so on to three zeros for minus four. There is always *one less* zero than the minus characteristic. All this is baffling to the beginner, but if the method of subtracting from a zero characteristic is known, an architect will not have much difficulty in determining various characteristics.

The great advantage in the use of logarithms is formed when it is necessary to use logarithmic trigonometric functions. A table of logarithms of the sine, cosine, tangent, and cotangent for each minute is given in Smoley's Tables. The logarithm of the sine of 36 degrees and 52 minutes can be found to be 9.77812. It is necessary to find the side *a* of a triangle such as shown in Fig. 9, and for this purpose it is required that the sine be multiplied by 5. The logarithm of 5 is 0.69,897 and the computation can be developed as shown below:

$$\begin{array}{lll} \text{Log sin } 36 \text{ degrees } 52 \text{ min.} & & = 9.77812 \\ \text{“ feet } 5 & 0 & = \underline{0.69897} \\ & & 0.47709 = \text{Log } 3 \text{ feet} \end{array}$$

This checks with the results given above. This example is fairly simple, but those with larger and more intricate dimensions can be solved in as simple a manner.

Announcements

The Arden Gallery, 599 Fifth Avenue, New York, announce a Christmas sale and special exhibition of durant faience, decorative paintings, and imported glass, lamps, shades, and bridge tables, and many novel and attractive holiday gifts specially designed by Arden Studios. To December 29. Mrs. John W. Alexander, Mrs. James C. Rogerson.

Seeing Your New House in the Movies.—In various parts of the country model homes have been constructed with the idea in mind of stimulating an interest in home-building. These model homes have created a great deal of interest locally, but have done little nationally. The demand for some method of giving national scope to this movement finally resulted in the Atlas Educational Film Company, of Oak Park, Illinois, being commissioned to produce a five-reel feature film showing the erection, equipping, and furnishing of a modern six-room, brick, colonial home. This film will be shown all over the country under the auspices of and with the co-operation of real-estate boards, commercial, advertising, rotary, Kiwanis, Lions, and other clubs and organizations; also through official government non-theatrical distribution bureaus (one located in almost every State, usually the State University), through churches, community centres, etc.

Aymar Embury II, Architect, announces the removal of his office to 150 East 61st Street, New York City.

Alfred S. Kellogg announces his retirement from the firm of Brainerd, Leeds & Kellogg, Architects and Engineers. He will continue the practice of engineering of power plants, heating, and ventilation, electrical, etc., at 89 Franklin Street, Boston, Mass. November 1, 1922.

Paul Starrett, formerly president of George A. Fuller Company, and W. A. Starrett, formerly a vice-president of that company, announce the formation of Starrett Brothers, Inc., Builders, with offices at 101 Park Avenue, New York City.

Anno Kolbe, Architect, is now associated with Jordan Green, 27 Chisten Street, Newark, N. J. Mr. Kolbe was for twenty years with Tracy & Swartwout, 18 West 34th Street, New York City.

Arthur T. Remick, Architect, announces the removal of his office from 52 Vanderbilt Avenue to 135 East 43d Street, New York.

Theodore L. Perrier, Architect, announces the removal of his office to 602 Tulane-Newcomb Building, 211 Camp Street, New Orleans, La.

Samuel H. Pitcher Company, Incorporated, Civil Engineers and Architects, 44 Front Street, Worcester, Massachusetts, announces that Mr. John Tempest Walker will in future, as an associated partner in the company, direct its architectural activities. Mr. Walker has had a wide experience as a practising architect in New York, Pittsburgh, and Boston.

The firm of Hawkins & Hoener, Architects, has been dissolved, the business being conducted in the future under the firm name of Earl Hawkins & Co., Architects, 400 McDaniel Building, Springfield, Missouri.

The Pittsburgh Architectural Club announces its annual exhibition to be held in the Carnegie Galleries from the 3d to 24th of December, 1922. Entry slips will be mailed during the month of November.

I. Albert Hartman, Architect, formerly in business in Scranton, Pennsylvania, for over twenty years, has moved to Rochester, New York, and has now opened an office at 1193 Culver Road, and would like manufacturers' samples and catalogues.

Henry Calder Thorne, Registered Architect, announces the opening of offices at 139 East State Street (Sage Block), Ithaca, New York, for the general practice of architecture and landscaping. Formerly with Gibb & Waltz, Architects, Ithaca, New York. Manufacturers' catalogues and samples requested.

The Winter Exhibition of the National Academy of Design

THE Winter Exhibition of the National Academy opened on the 18th of November and will continue until December 17. It is one of the best exhibitions ever shown in the galleries.

The following are the prize winners:

The first Altman prize of $1,000 to Leon Kroll's "Sleep."

The second Altman prize of $500 to Childe Hassam for his composition, "The Sun Room."

The Carnegie prize of $500 to Edward W. Redfield's "The Valley in Sprintime."

The Julia Shaw Memorial Prize of $300 to Gertrude Fiske for her "Nude."

The Thomas B. Proctor prize for the best portrait, carrying with it $200, to Giovanni B. Troccoli for "A Veteran of the Civil War." The Helen Foster Barnett prize went to Brenda Putnam for her sculpture, "Sun Dial." Harriet W. Frishmuth won the Elizabeth N. Watrous gold medal for sculpture with her "Fantasie," and Guy Wiggins was awarded the J. Francis Murphy memorial prize for his snowscape, "The Quiet Valley."

The American Art Association in Their New Building

The new building of the American Art Association on Madison Avenue brings an old and famous organization into the centre of the art zone. Their old building on Twenty-third Street and the pictures and other art that were sold there have had a notable place in the story of art in New York City. Mr. Kirby and his associates have had indeed a large influence in educating the public taste in art in general.

Prizes Offered by the College of Industries, Carnegie Institute

THE College of Industries at Carnegie Institute of Technology, Pittsburgh, announces a prize contest for the best papers written on the subject of "The Use of Vitrified Clay Pipe in Plumbing Systems," the contest to be open to plumbing experts, instructors, and students. Prizes to the amount of $250 will be awarded on April 15, 1923.

According to the announcement, the contest has been arranged to further the interest in reducing the cost of plumbing installations, and to assist the industry to become better acquainted with the development and use of vitrified clay sewer-pipe. The money has been made available by the Eastern Clay Products Association.

The contest is divided into three classes of competitors, as follows: Class A. Those who have had experience in the installation of plumbing systems or house sewers. Class B. Instructors. Class C. Students in the Carnegie Institute of Technology or other institutions of learning where house drainage is taught. Contestants are required to send in their names and class distinction before January 15 to the committee chairman, and complete papers must be in the hands of the committee before April 15.

A first prize of $100.00 will be awarded for the best paper in all classes. A second prize of $50.00 will be awarded for the second best paper in all classes. A third prize of $50.00 will be awarded for the best paper in the class which did not receive first or second prize. If first or second prizes are awarded in one class, an additional prize of $50.00 will be awarded so that two third prizes of $50.00 each will be given in each of the remaining classes.

The Contest Committee consists of: Professor S. E. Dibble, chairman, College of Industries, Carnegie Institute of Technology; William J. Woolley, manager, The National Trade Extension Bureau, Evansville, Indiana; John T. Morris, director, College of Industries, Carnegie Institute of Technology; Joseph A. Weldon, Weldon and Kelly Company, Plumbing-Sanitary Experts, Pittsburgh, Pa.

All communications regarding the contest should be addressed to Professor S. E. Dibble, Head of the Heating and Ventilating Department, College of Industries, Carnegie Institute of Technology, Pittsburgh, Pa.

A Standard Zoning Law

A STANDARD law for the assistance of those responsible for the framing of State zoning enabling acts has just been issued by the Department of Commerce. Zoning ordinances for the regulation of use, height, and area of buildings are being adopted by cities in almost every State in the Union, and in some States where there is no specific authority for zoning these ordinances may be set aside by the courts. An enabling act is advisable in all cases.

The Department of Commerce model for an enabling act under which municipalities can adopt zoning regulations is a twenty-page, mimeographed document with foot-notes covering questions which might arise in the wording of various sections and provisions. It is not a federal law, but a suggested form for State zoning enabling acts.

The publication may be obtained free of charge from the Division of Building and Housing, Department of Commerce, Washington, D. C.

(*Continued from page* 384)

der what history can offer us in the way of suggestions for the present and the future. It seems to me that if one wants to formulate for himself a method of procedure he should turn to that past style the forms and ideals of which most nearly coincide with modern forms and ideals. That style would unquestionably be the Greek. It comes nearer, in my estimation, combining form and color in a fine, logical and architectural way, than any other historic style. Color values in Greek architecture were generally chosen so that they enhanced the architectural effect. With a complete understanding of the principles of polychromatic variation as practised by the Greeks it ought to be possible for the architect of to-day to build up *his* theory and practice of color in architecture.

An Unusual Opportunity

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